THE FOUNDRY

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A Modern Foundry in Europe.

BY HENRY GRETENER.*

Probably at no previous time have such rapid strides been made in the improvement of existing foundry practice as during the last ten or fifteen years, owing to the fierce competition in every branch of the business

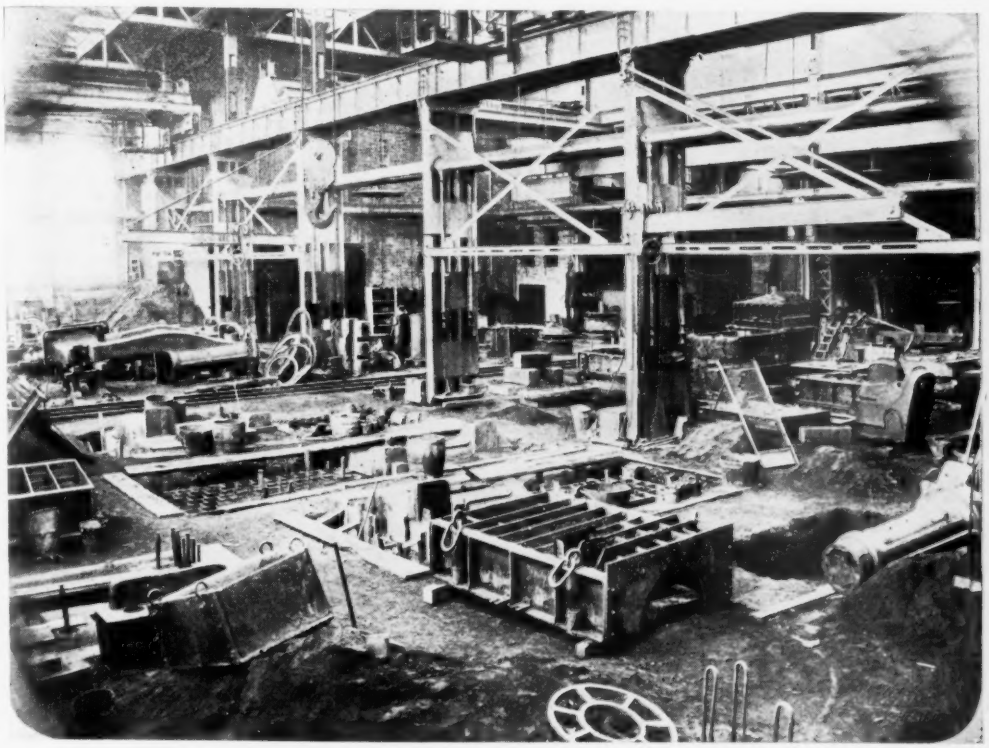

FIG. 1—HEAVY WORK FOUNDRY, SHOWING FORM OF ROOF CONSTRUCTION.

which make it imperative that the largest amount of work shall be produced in the cheapest possible manner. In very many cases exacting demands are made, not only with regard to the quantity, but also with the object of bettering the quality of the output, and this condition of things has called for a number of improved devices, such as quick-acting cranes, machines for conveniently handling the sand, equipments for drying molds and cores, for cleaning castings, etc. The management of the cupola too, has received its share of attention. The Trade Journals have given their readers a pretty good idea of how these things are done in the various foundries throughout the States, and, though the children of Brother Jonathan are very apt to consider themselves "The People" it may still be of interest to some of them to find out what people on the other side of the big pond are doing.

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The foundry under consideration is the largest one in Switzerland and its origin dates back to the early thirties, when it was founded in Winterthur by two brothers named Sulzer. It gradually grew, along with the machine shop attached to it, until at the present time the establishment gives work to about 2,700 men, not counting the branch houses, which have been started at Ludwigshofen in Germany and in Bruenn, Austria. In the course of years the foundry was removed from the old place to make room for the machine shop and is now located principally in two comparatively new buildings, one for the large work and one for the small work. Each one of these buildings has from time to time been enlarged, especially the former, the latest addition to which is constructed on what is now considered the best plan in that country. It is the intention of the writer to give in the following a description of the plan and general arrangement of these two buildings and their special features.

The foundry for heavy work is now a structure 482 feet long and 174 feet wide, measured over the widest part, inside the walls. The latest addition to it consists of two bays, each 51 feet wide. This part of the building will be of special interest, since it deviates considerably in its construction from the designs usually seen in the States, especially in its roof construction, which is entirely flat with the exception of the skylights. The latter run parallel with the bay, as shown in Fig. 2. The roof construction has now been used in other places for a number of years and has given entire satisfaction. There is not much chance for dust to hang up and darken the roof and it is really remarkable how very light this part of the building is compared with the older shed construction, in spite of the frequent cleanings the latter receives in this shop. There

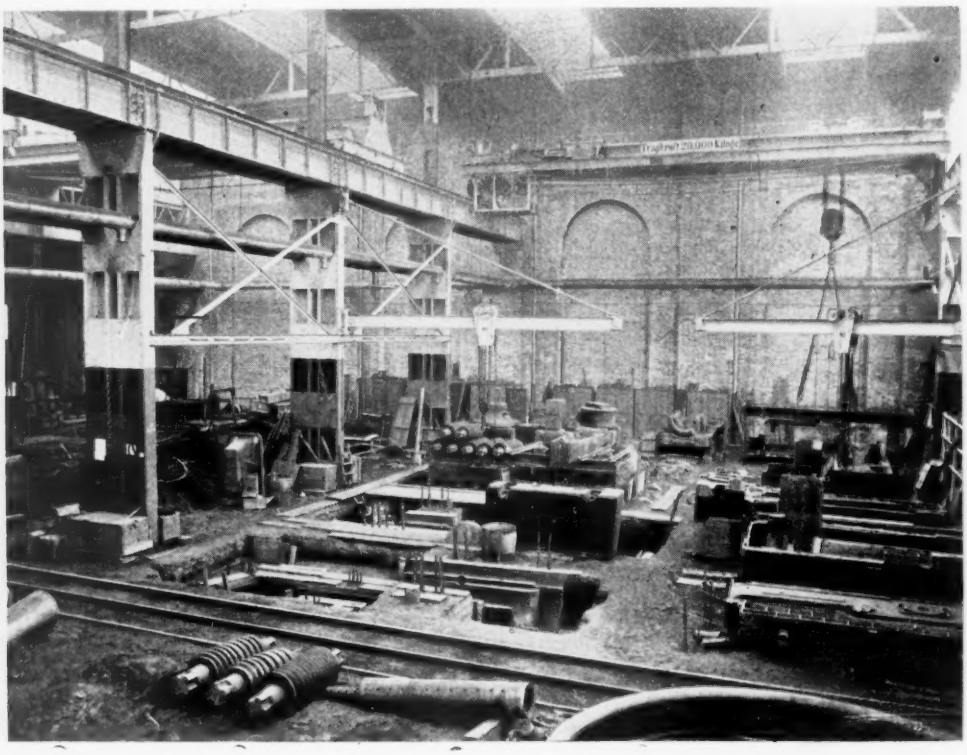

FIG. 2—ANOTHER VIEW OF HEAVY WORK FOUNDRY, SHOWING COLUMN JIB CRANES AND HOT BLAST PIPES FOR DRYING MOLDS.

is also much more headroom left for cranes. The roof itself is made as follows: Deep

A. SULZER,
OF SULZER BROS., WINTERTHUR, SWITZERLAND.

girders made of angles and flat iron, reaching from column to column across the track of the traveling cranes, support I beams that run parallel with the track. These I beams are placed at a distance of 8 feet 6⅜ inches, center to center, and are inclined about 4 degrees towards both sides from the three columns standing nearest to one side of the central railroad track. This gives a like inclination for the roof in the direction of the crane tracks, in which way proper drainage is secured for the otherwise flat surface. Over the whole length of the I beams are fastened timbers, to which are nailed 3-inch boards. On top of the boards is first placed a thin layer of sand, then one layer of what is called "carton pierce for roofing," a kind of tar paper covered with sawdust. Over this a composition something like tar (in German called "Holz-Cement"—wood-cement) is applied with a brush. Then follows one layer of common paper, which in turn receives a coat of this wood-cement. Again a thickness of common paper with a coat of wood-cement is put on. On top of this follows another layer of carton-pierce and then about ¾-inch of sand, and finally 3 inches of gravel. The gravel and sand in themselves form a protection against fire and the wood-cement is prepared in such a manner that it will not

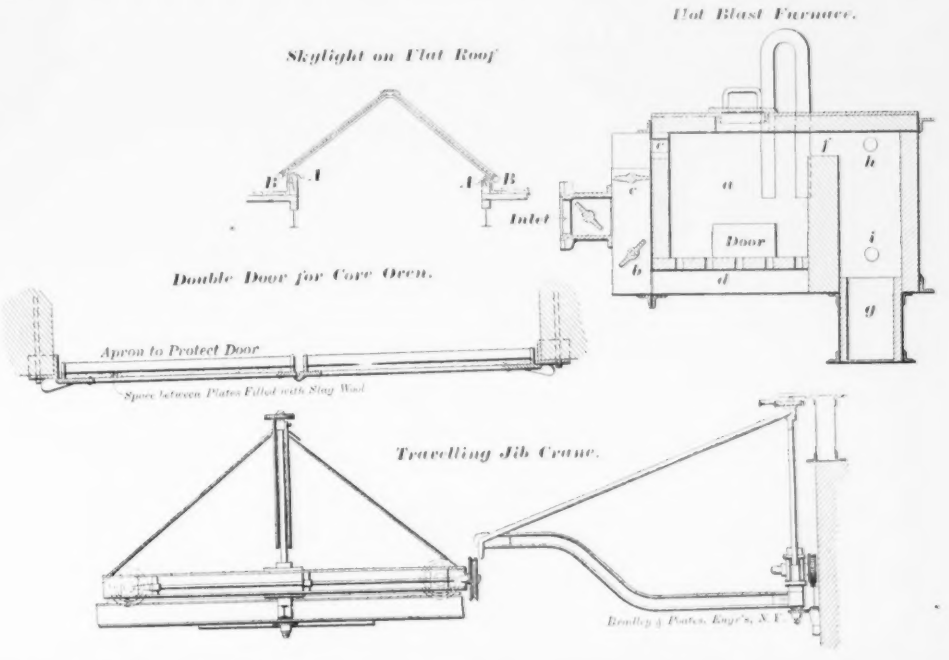

FIG. 2 A—CONSTRUCTION OF SKYLIGHTS—SECTIONAL VIEW OF HOT BLAST FURNACE—CONSTRUCTION OF CORE OVEN DOORS—TRAVELING JIB CRANES.

burn. The construction of the skylights is shown in Fig. 2A. The glass is placed between two T irons in each pane, the lower ends of the flange being turned up to hold the glass from sliding down; A forms a continuous gutter of sheet iron to catch any water that may condense on the inside of the glass roof in cold weather. Another piece of sheet iron covers the top and outside of the beams supporting the skylight and reaches about 8 inches between the lower thickness of carton-pierce and the first layer of paper, so as to prevent any water from coming in contact with the woodwork. This is shown at B.

Between the three rows of columns of this new addition are located the run ways for two 20-ton cranes in one bay and one 25-ton and one 12½-ton crane in the other bay. They are all electric cranes on the one motor alternating current system. The motors are 13 horsepower on each crane. Below is the table of speeds for the various operations connected with these cranes.

The greater speed for lifting light loads is effected by throwing in other gears. The span from rail to rail is 47 ft. 6 ins., the distance from floor to rail top of crane track 26 ft. 3 ins. Instead of using chains these cranes have all been built for wire ropes (1⅛ in. diameter on 25-ton crane), which gives a much smoother motion in lifting than is possible with a chain, an important point in foundry work. Ropes have the further advantage that if they break, they do not go without warning like a chain. The hooks all turn on ball bearings, with balls about ⅝ inch diameter, which run on hardened steel plates, the latter having circular grooves turned for the balls to run in. The

Capacity of Crane.	25-ton.	20-ton.	12½-ton (a 2,200 lbs.)
Speed for lifting the full load	3 ft. 2 ins.	3 ft. 11 ins.	6 ft. 6¾ ins.
Speed for lifting half the load	6 ft. 3 ins.	7 ft. 10 ins.	13 ft. 1 in.
Speed for racking carriage	19 ft. 0	24 ft. 6 ins.	39 ft. 5 ins.
Speed for travelling	82 ft. 0	82 ft. 0	82 ft. 0

FIG. 3—MOLD FOR ENGINE FRAME

track for the cranes is made of plate girders with double webb 3 ft. 1½ ins. deep. The rails are about 100 lbs. per yard, bolted at short intervals to cast iron plates, which in turn are bolted to the top of the plate girders. The columns supporting the latter are 22 ft. 11½ ins. apart, and on every second one is also placed a light jib crane with a jib 25 ft. 9 ins. long, carrying a 3-ton chain hoist of very good design. Each of these jib cranes serves the nearest two floors; they can be plainly seen in Figs. 1 and 2. The movable pipe sections to the furnaces, which are placed on the cope after the latter is set over the drag part of the mould. (In Fig. 1 some of these vertical pipes are shown, while in other places short branches from the main pipe only are seen, the connections not being finished yet.) It must be mentioned that, when using the hot blast furnaces, the copes are not closed down over the drags, but raised up a little, generally to the depth of I beams that are set all around the mold, to support the flask of the cope. The joints

FIG. 4—GENERAL VIEW OF THE HEAVY WORK FOUNDRY, SHOWING TRAVELING JIB CRANE.

large galvanized iron pipes seen all along the walls and sides belong to the system of hot blast, which is so extensively and successfully used by this concern for drying the large molds, where the drag part is formed in the floor. At the time the photos were taken new pipes were just being put in place throughout the building, as the old system was found to be too small in diameter. At short intervals branches are seen in the main pipe running down to the floor, from where connections can be made by and openings left are closed with a little loam, to prevent the heat from going out too quickly. A section through such a hot blast furnace is shown in Fig. 2A. Their operation is as follows: The fuel is placed in the space "a," the valve "b" opened and valve "c" closed, so that the cold blast from the admission pipe goes through the grate "d" and the fuel until the coke is well burnt through. Then valve "b" is almost closed and valve "c" fully opened, so that now most of the blast goes over the bridge "e,"

over the white hot fuel in space "a" and over the bridge "f" into tube "g," which connects to inside of mold, either through the risers, or through holes that are filled in again after the mold is dried. The two holes in "h" and "i" on the side are closed with plugs that can be taken out to see whether any flame is coming over the bridge "f," in which case valve "c" would have to be closed partly. The pipes of this system along the wall, form one continuous circuit or an endless pipe line, acting as one reservoir for the blast, which is furnished by a special fan. The diameter of the main pipe is 24 ins. through a considerable part of the building, that of the admission pipe to the furnaces is 3 ins. The whole pipe line is very well made, with large bends, so as to offer the least possible resistance to the flow of the air.

In the rear of Fig. 1, in the second bay, are seen two ovens. The larger one is 26 ft. 3 ins. long by 16 ft. 1 in. wide, the other of the same length, but only 5 ft. wide. Both are 11 ft. 10 ins. high and built to receive any work that requires drying in ovens, the latter specially for drying molds for turbine shafts. In front of the ovens, a little to their right, are located two gear molding machines for making spur and bevel gears. They are both of the type designed by Mr. Rothwell Jackson in the fifties, where the mold is revolved on a circular table, and a segment with a few teeth that serve as pattern, carried on an overhanging arm. The latter slides on a horizontal bed, so as to be adjusted to any diameter within the range of the machine, which is up to 9 ft. diameter. To one of the machines can be attached a rig carrying an arbor with a single milling tool, with which it is possible to cut the pattern segment on the machine itself. The cutter makes about a thousand revolutions per minute. For cutting both gears the cutter has the same shape as the small end of the teeth, the large end has to be dressed by hand afterwards. In this machine are also cut

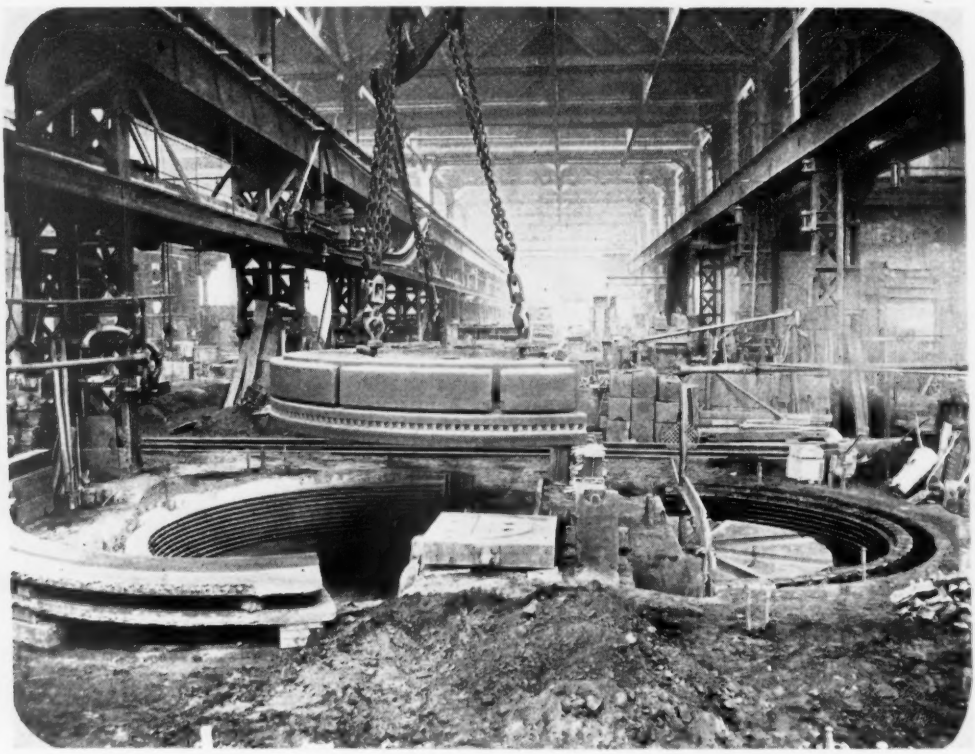

FIG. 5—MOLD OF FLY WHEEL AND ROPE PULLEY COMBINED—WEIGHT, WHEN FINISHED, 50,000 POUNDS.

those complete gears that have wooden cogs.

The principal work so far done in this new section are on the side shown in Fig. 2, the heavy engine frames. The largest one of those made in one part, weighs 15 tons @ 2,200 lbs. Fig. 3 shows such a mold in course of construction. The other side will be used for other heavy pieces, such as frames for ice machines, condensers, etc. (At the time of writing the large castings were cleaned in the latter space, because the new cleaning room was not quite completed yet.) At present there are six engine frames of various sizes on the floor continuously. As soon as one is cast, another one goes in. The ladles with the iron, as well as any other material, is brought to this section of the foundry on cars, that run on a railroad track, both standard and narrow gauge in the center across the two bays.

The older part of the building in which the cupolas are located, is constructed in a different manner. The roof is of the shed type. There are three tracks for cranes, that run at right angles to those in the new part. The cranes are run with a rope drive. Two of the tracks have three cranes each of 20 tons capacity and 35 ft. 9 ins. span, while the last track, which is not as long as the others, has but two, also of 20 tons capacity, but 47 ft. 9 ins. span. All these cranes use either the Gall link chain, or the ordinary pitch chain. Under the two long tracks are located two movable jib cranes, running on one I beam fastened with overhanging arms just below the crane track, and one rail further down as shown in Fig. 2 A and Figs. 3 and 4, with a jib 13 ft. 2 ins. in length, carrying a chain hoist of 2 tons capacity. These cranes, though they are now operated by hand, have proved to be very efficient, and it is intended to run them by electricity later on. Fig. 4 gives a general view of this part of the building, where most of the molding is done in the floor, with sweeps, in green sand, and without patterns. In this manner are molded all kinds of fly

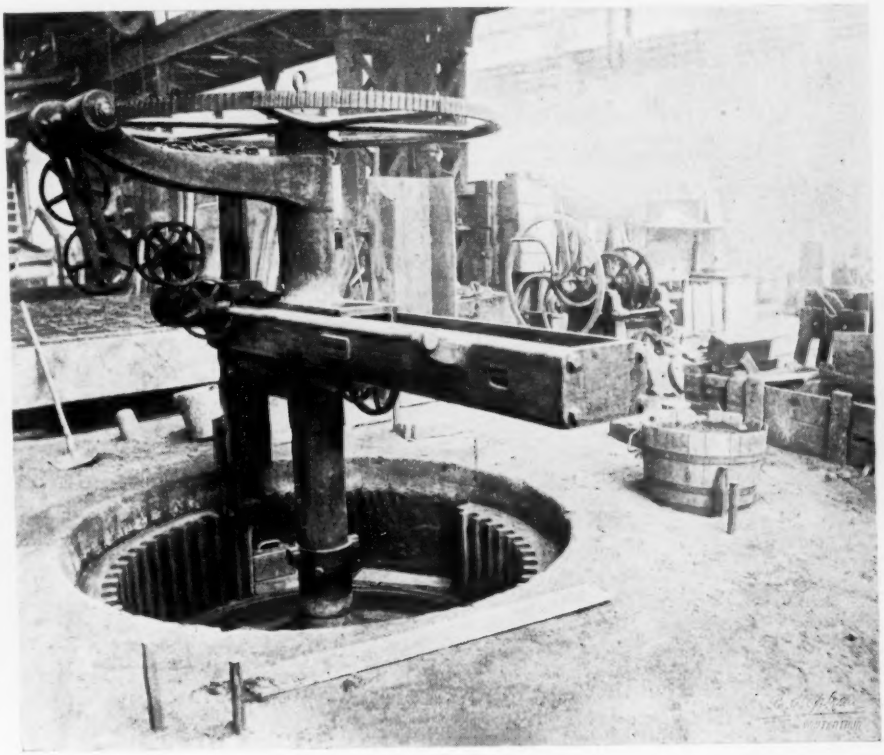

FIG. 6—GEAR MOLDING MACHINE.

wheels, rope pulleys, small turbines, large pistons, etc. But all these molds must be carefully dried afterwards owing to the composition of the sand that is found in that part of Europe, and which contains a good deal of a loam. Fig. 5 shows such a mold of part of a fly wheel and rope pulley combined, which is cast in four sections, that is, the halfs are each cast in two pieces of half the rim width, that are afterwards bolted together. The diameter is 18 ft. 4½ ins., the total weight of the whole wheel will be somewhat different. The arms are also made with a sweep.) The parts that are lifted out are dried separately in large ovens built for that purpose. Some of them are too large for the ovens, however. If this is the case, they are put down in a square pit 23 ft. 8 ins. by 15 ft. 5 ins., and about 9 ft. deep. This pit is then covered over with two large pieces of corrugated iron that turn on hinges, and used as a drying oven. There is a round hole dug down from the bottom of this pit, which was used up to the present

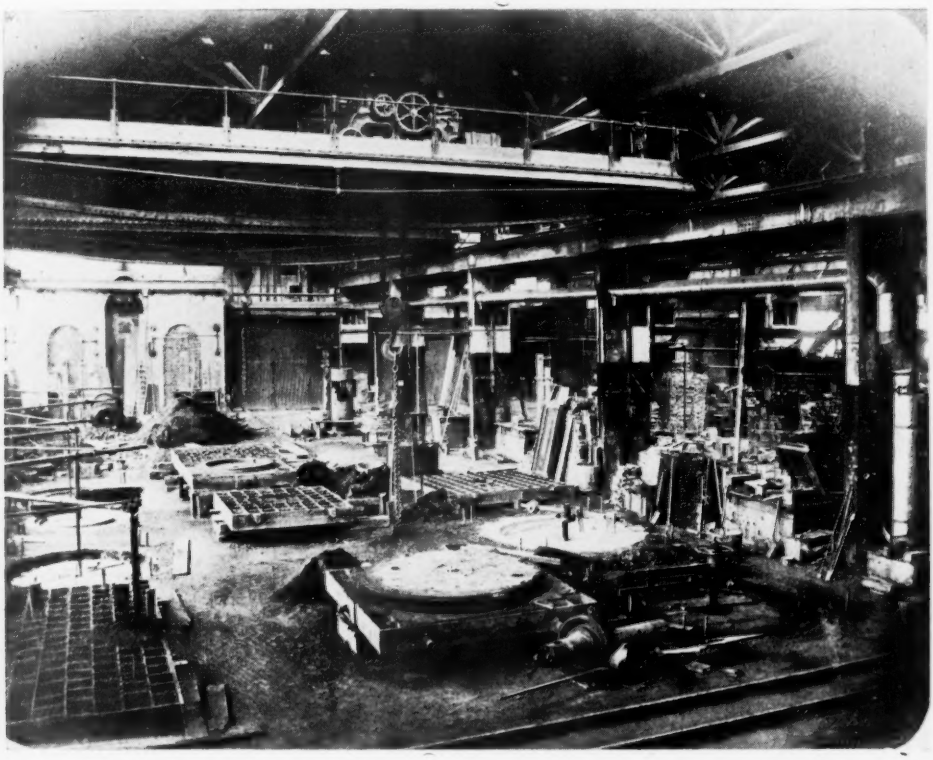

FIG. 7—ARRANGEMENT FOR MOLDING TWO PARTS OF FLY WHEELS FROM THE SAME SWEEP AND THE SAME CENTER.

be something over 50,000 lbs. It ought to be mentioned here that the grooves for the ropes are swept up in loam instead of sand, the rest in sand. The part inside the rim is made in such a manner that it can be lifted out. (In wheels with but one set of arms, as shown in the mold to the right in Fig. 5, the parting is made in the center of the arm thickness, and the upper part is then rammed up in a flask. In wheels with two sets of arms of course the process must time to receive flasks in which hollow turbine shafts up to 24 ft. in length are cast on end. The heaviest ones weigh 7½ tons and the shaft with flask and sand about 25 tons. On account of this heavy weight, however, the casting of these shafts is now to be transferred to the new building under the 25-ton crane, where a similar pit has been built for the purpose.

Fig. 6 shows a large gear molding machine with a spur gear of very coarse pitch just

being molded on it. The largest work, that this machine will do, is 18 ft. diameter. In the same figure, somewhat to the right, appears part of a machine, on which cores are turned on centers. It resembles a lathe, but has a large hand wheel on the rear of the head stock for driving, with two sets of gearing for turning large or small cores, similar to the back gear of a lathe head stock.

FIG. 7 A—SHOWING ARRANGEMENT EMPLOYED IN MAKING SPLIT WHEELS FROM ONE CENTER.

In the foreground of Fig. 7 is seen an arrangement by which the two parts of fly wheels, that are cast in halfs, can be made with one and the same sweep, from the same center. On the surface of the cast iron plate, on which the pivot shaft stands, is cast a cam, the shape of which pretty nearly approaches two circular grooves with centers as far apart as the distance between the centers of the two halfs of the fly wheel (see Fig. 7 A). A roller is guided in the cam groove and is attached to the slide carrying the sweep on its outer end. The slide is moving in and out on an arm that is revolved round the central pivot, the sliding motion, of course, being produced by the roller following the groove, which is not concentric around the mast. The shape of the groove ought to be such, that the sweep describes two true half circles with centers the above mentioned distance apart. This distance between the centers of the fly wheel halves is selected by the designs according to the requirements of the work, when lay-

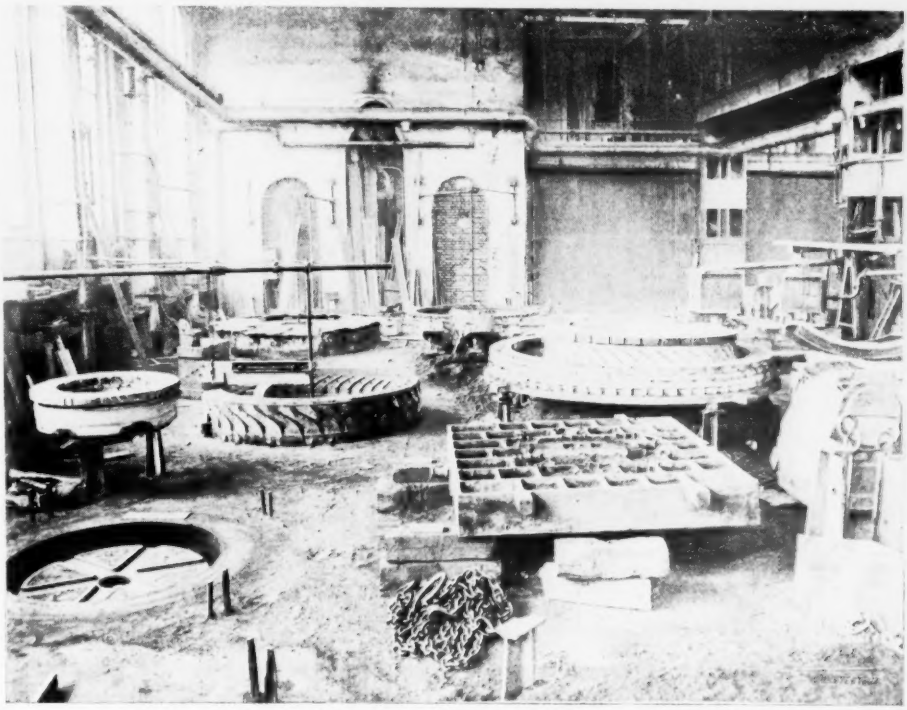

FIG. 8—COMPLETE MOLD FOR LARGE TURBINE WITH A DOUBLE ROW OF BUCKETS.

ing out the cam groove. Absolute accuracy of the circles described by the sweep can only be attained for one size wheel with this arrangement, and therefore the groove is constructed for a medium size, but the variations for larger and smaller diameters are so small that they can be neglected altogether. A core is set on each side between the two ends of the rim of a thickness equal to the distance between the two centers, less the allowance for finish. A similar core separates the two halves of the hub. These molds are swept up in sand and owing to the large floor room taken up by a wheel molded in this way, anything above 13 ft. diameter is made one half at a time. A machine like the one just described, but of smaller dimensions is seen in operation in the second mold from the front.

Fig. 7 gives a general view of the part of the foundry where mostly loam work and the necessary cores are made, while Figs. 8 and 9 show details. Fig 8 is a complete mold for a large turbine with a double ring of buckets. Steel blades are used in the inner ring and cast iron blades on the outer one. To the right is shown the ring with the steel blades. The latter are placed in position and rammed up with sand between, the whole resting on a heavy plate on brackets. The steel blades are tinned at the projecting ends so as to unite firmly with the hot metal. In the middle of the figure is visible the outer row of cores for the cast iron blades. To the left is shown the small center piece all ready to go inside the inner row. In the rear, also to the left, is shown a row of cores that are being dried, and to the right are seen two of the hot blast furnaces before mentioned. They are placed on top of a mold, with the connections made to the pipe line.

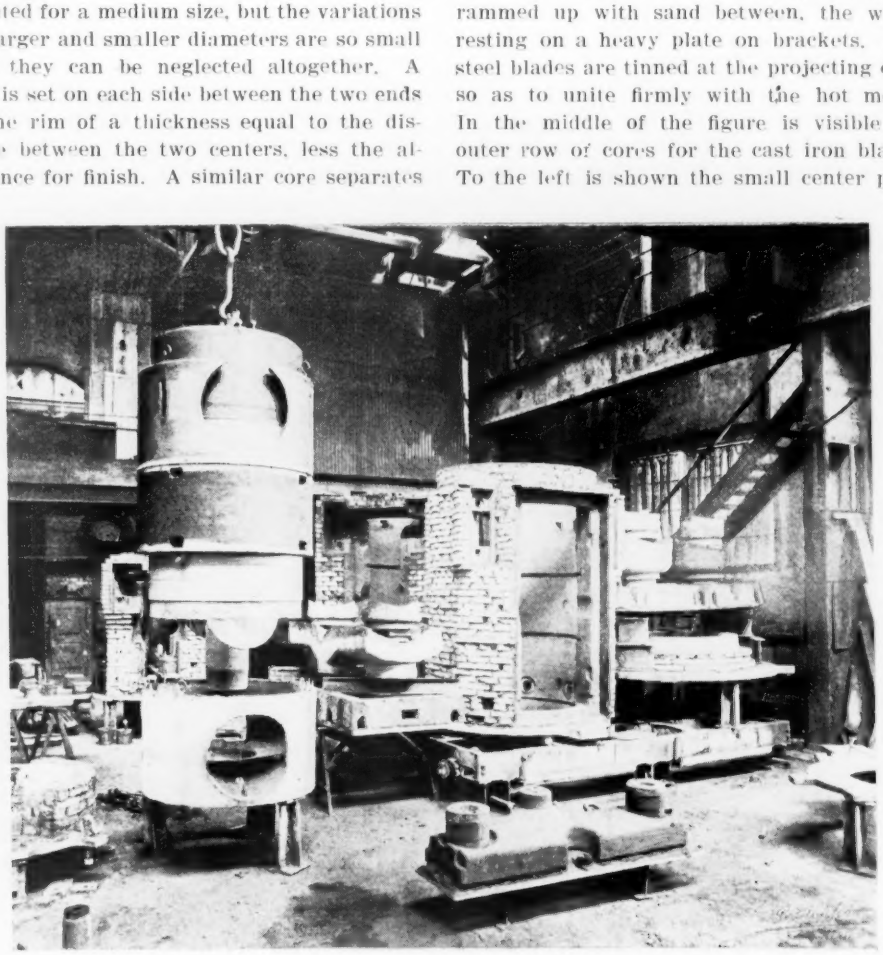

FIG. 9—PARTS OF A CYLINDER MOLD FOR A SULZER ENGINE. (CAST WITH STEAM JACKET.)

Fig. 9 shows the parts of a cylinder mold for one of the well known Sulzer engines. Most of these cylinders are cast with an outer and inner wall enclosing a complete steam jacket. The largest ones, however, have a separate bushing, which, together with the

cylinder casting forms the jacket. The heaviest ones of the latter kind weigh about 20 tons. They are cast at the rate of about 20 a month in loam (the smallest ones are made with patterns, and the latter included they cast one every day). After the cylinder molds are dried they are put in one of the five pits built for the purpose. These pits are all surrounded with brick walls and are not rammed up with sand before pouring. Instead of that several courses of plate are put round the mold, like a circular shell, the other courses, each one in succession being rammed up. This arrangement naturally saves a great deal of work in getting the pit ready again for another cylinder, as the plate can be taken off a few hours after casting and only the brick walls remain standing round the casting for one or two days, according to the size of the cylinder.

For work of this class the drying ovens must naturally be of a corresponding size, as well as the cars on which the work is brought to the oven. At the rear, in Figs.

Large Core Oven Car.

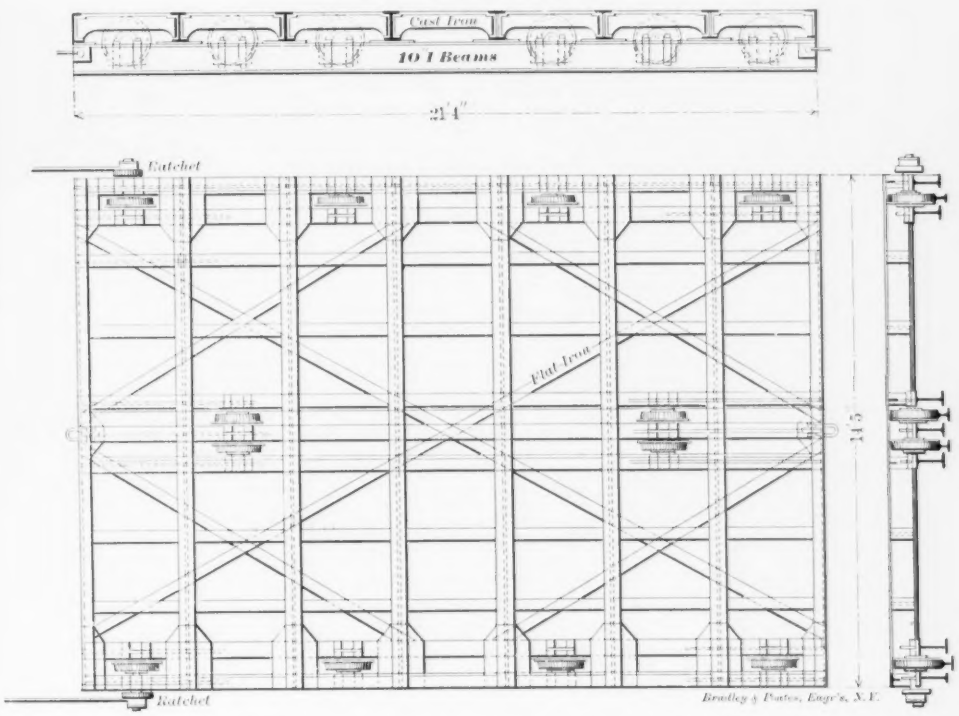

FIG. 9 A—PLAN AND ELEVATION OF CORE OVEN CAR.

each course consisting of a number of segments that are bolted together. For the lowest course stronger plate is used on account of the heavy pressure the iron exerts against the lower part. For the same reason this first course usually consists of two rings. The inner one is first put up, leaving enough space inside the plates in order that it can be conveniently rammed up with sand. After that the outer ring is also set up and rammed. On top of the outer ring follow 8 and 9, are seen several of them, all of the same dimensions, viz.: 23 ft. long by 19 ft. 8 ins. wide by 13 ft. 2 ins. high. The firing is mostly done in two or four holes in the floor. The grates are accessible by means of an underground passage. The roofs are formed with I beams and brick arches between in a very substantial manner. The doors are all double, some made of corrugated iron and some of the flat plates with cast iron frames. The space between the outer

and inner plates is filled with slag-wool, to prevent the heat from going through. A third plate is usually fastened to the inside, reaching three or four feet up from the ground, so that the door itself does not catch the full heat from the furnace holes. Fig. 2A shows a section of such a door. All drying ovens in the loam foundry have doors that are raised up vertically, and their roof is about level with the sand-mixing room, located in the rear on the second floor, so that it can be used for drying sand.

The part, standing directly over the fire, when in the oven, is lined with fire brick. This lining is visible on car front in illustration. It will be noticed that the lower seven 10 in. beams are very close to the ground. This is to give as much height as possible from top of car to roof of oven and yet the largest cylinder molds are too high to go in the oven, and therefore dried in the pit. Figs. 10 and 11 give general views of the loam foundry in the front and the green sand molding in the distance.

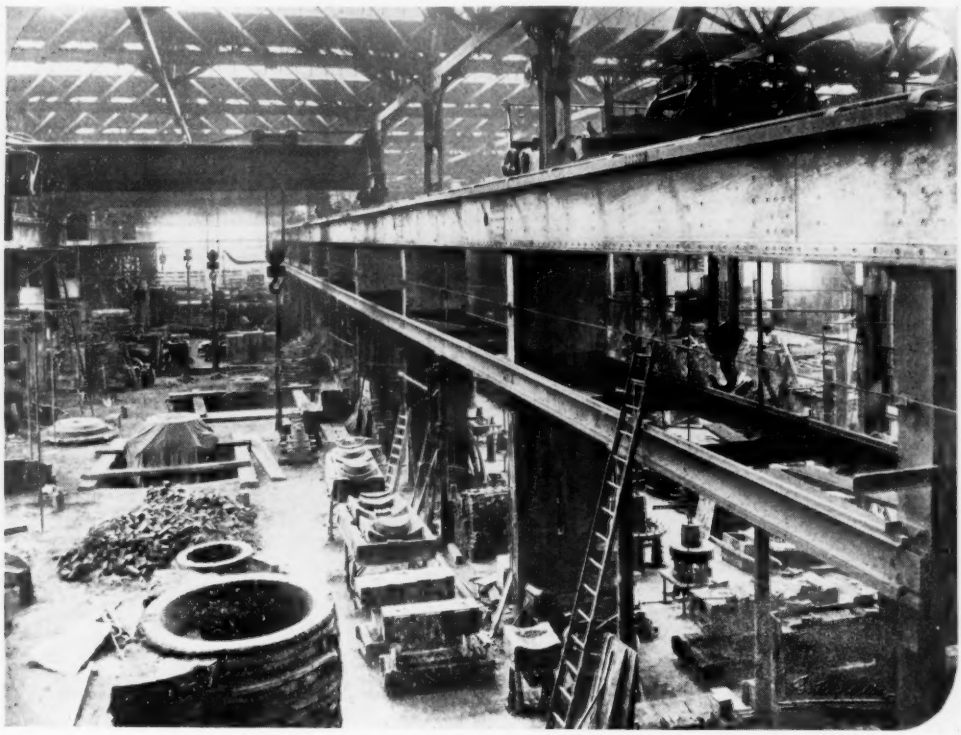

FIG. 10—GENERAL VIEW IN LOAM FOUNDRY.

The next sketch, Fig. 9A, shows a large core oven car made of I beams with cast iron brackets put loose between, so that they can be moved about at will. For such a large car it has been found, however, that the action of the heat warps the I beams out of shape. They intend to try one of cast iron, with some kind of a roller bearing in all the 22 journals. When these cars are fully loaded they have to carry thirty tons and more. One of them is shown in Fig. 9.

These views are taken from the top of the drying ovens, behind which are located the sand chambers or sand magazines in the basement, in which a great deal of the winter's supply can be stored away, and on the second floor above them, as already mentioned, is the sand and loam mixing room. This department is arranged very much like the one in the foundry for light work, which latter shows so many features of interest that it will be described and illustrated separately later on.

Fig. 12 shows three of the four cupolas standing in the middle of the total length of the building. The platform is 17 ft. 9 ins. from the floor level, and near the wall it has an hydraulic elevator of 2 tons capacity, working under 90 to 95 lbs. water pressure. Since these cupolas differ considerably from the designs usually met with in America, it will be of interest to have some further details regarding them. A receiver directly connected to the stack by means of a short socket, is used with every one of these opening covered over with a ball, that can be raised from its seat by means of a lever so as to give vent for the gases from time to time. There are two distinct types of cupola used in the shop, with regard to the arrangements of tuyeres. The one is the "Rapid," Stuart's patent, with three rows of tuyeres, the other is an old Ireland type with two rows, but provided with a receiver. I will give the principal dimensions of one of each type.

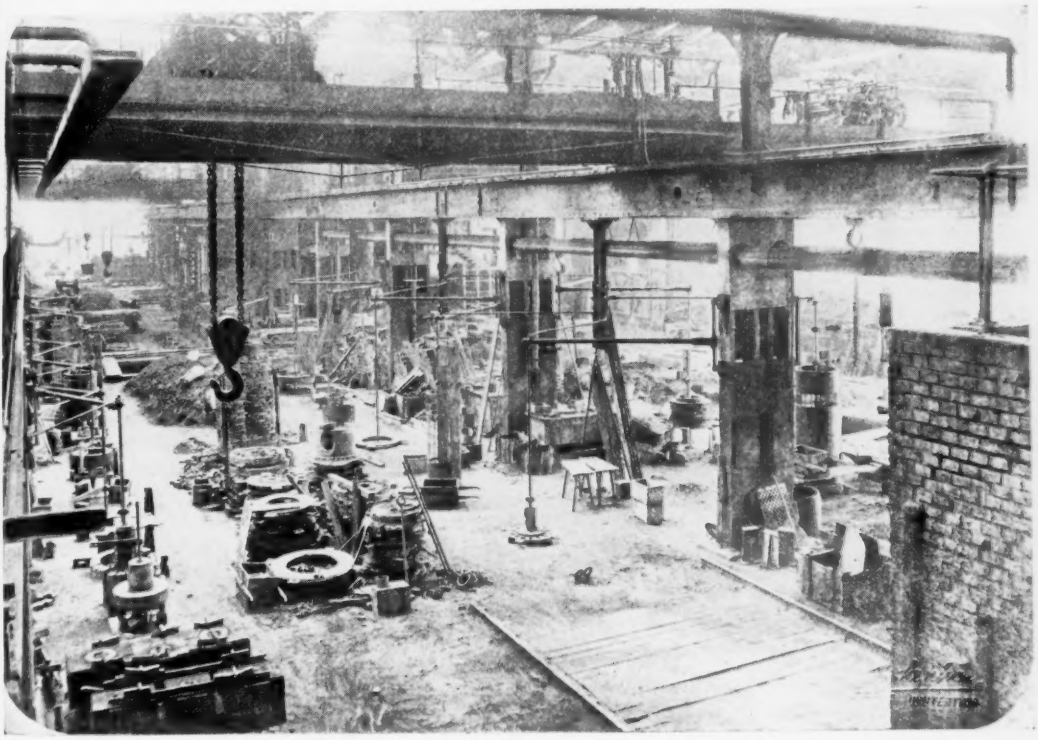

FIG. 11—SAME AS FIG. 10—GREEN SAND DEPARTMENT SHOWN IN THE DISTANCE.

cupolas. The bottom of the main stack has a drop door, the same as is usual in America. In some cases the bottom plate is inclined so that the sand bed can be made the same thickness all over. Just below the charging door a cast iron ring is set in the lining so as to protect the bricks, when throwing in the charges. The lining tapers down to a point just above the tuyeres. The kind of bricks used are the standard arch bricks 3x4½x9 ins., no large cupola blocks at all. The receiver is arched over on top, and has an

First. "Rapid": Diameter of shell, 5 ft. ½ in.; diameter at tuyeres, inside lining, 2 ft. 8 ins.; diameter below charging door, 3 ft. 10 ins.; above charging door, 4 ft. 3 ins.; distance from center of lower tuyere to sand bed, 20 ins.; diameter of three lower tuyeres, 5 ins. each; distance from center of lower tuyere to center of middle tuyere, 11¾ ins.; diameter of three middle tuyeres each 4 ins.; distance from center of middle tuyere to center of upper tuyere, 11¾ ins.; diameter of upper three tuyeres, 3 ins. each. All three

rows of tuyeres have one common windbox on the outside of the stack. The lower tuyeres are inclined up towards the center, the upper tuyeres slope down and the latter can be shut off entirely. The diameter inside

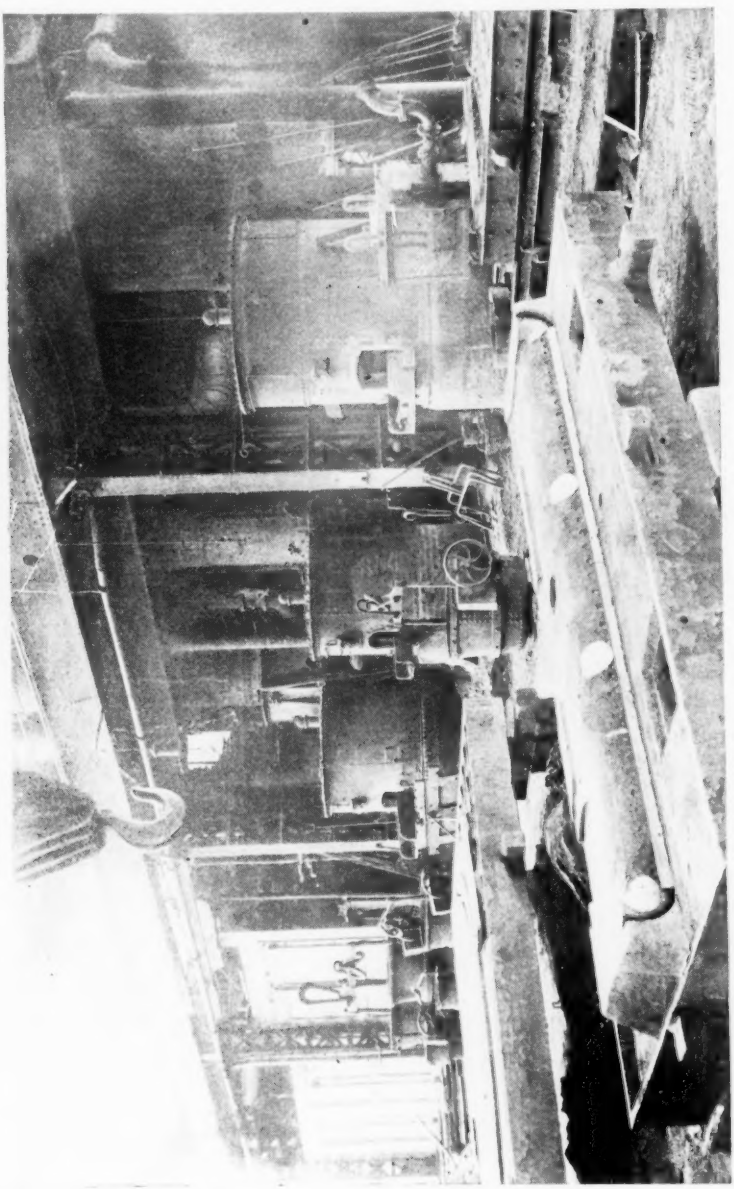

FIG. 12—SOME OF THE CUPOLAS AND RECEIVERS.

of lining of receiver is 4 ft. 5 ins. The opening from stack to receiver is not less than 10 ins. high and 5 ins. wide. The receiver itself can hold as much as seven or eight tons of iron. Over the hole in the receiver shell, which is cut out for tapping, and which is about 16 ins. wide by 18 ins. high to admit a man, is wedged a plate cover with a small opening for the tap hole. The hole in the lining of the receiver is formed by leaving a small space between two bricks. A cone-shaped plug is pushed in the clearance thus left and fire clay pressed all around the plug to make a smooth hole. The actual melting capacity of this cupola is seven to eight tons per hour, with a blast pressure of 15 oz. or 25½ ins. water column.

(To be continued.)

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

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THE FOUNDRY

Is issued promptly on the first of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

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Trade Outlook.

Labor troubles and midsummer suspensions prevent an attempt to forecast the future with any confidence. The labor disturbances, while not affecting the foundry trade directly, still make their influence felt in an indirect manner by causing suspensions in many industries, which are heavy consumers of castings. Nor can it be said that a general suspension of work for even a short period can be looked upon as favorable, for while a reduction in stocks might be desirable the reduced purchasing power of those affected by a suspension of work would ultimately retard consumption and with it the prices of standard commodities.

Those in a position to judge, claim that the volume of business transacted in the iron trade is steadily increasing, though as yet there has been no important changes in the matter of prices for the better. Some large consumers have been buying iron ore and pig iron freely and some negotiations have begun for deliveries of pig iron during the last six months of the year at a very small advance over current prices. It is claimed that the southern railroads intend to restore rates, which, if carried out, will furnish northern furnaces with a larger market. All are hopeful of the coming fall exhibiting an active increase in all branches of industry.

The malleable foundries show an unusual activity as does also all foundries connected with agricultural works of different kinds, which are just now rushing to finish up the season's orders. The general jobbing shops and those engaged in producing cast iron pipe on the other hand furnish the greater number of idle, or nearly so, foundries. The stove foundries with their usual summer vacation, which was hastened by the very hot weather at the beginning of the month, have also helped to swell the list of temporarily closed shops.

Making Things Do.

The man who is handy in getting around troubles and who makes a specific study of overcoming everyday problems arising in the shop by contriving some makeshift for this purpose is sometimes given more credit than he is entitled to. The man who can turn out good work in a second class shop with third rate tools and appliances may be a

genius, but this need not necessarily imply that he is a paying investment on that account. It may pay to do things this way once, but when it comes to repeating it in succession the man with tools that will fit the job is going to win the day.

Too much credit has been accorded the man who can run a foundry with nothing. Like the molder who can do any job with a trowel and a ten penny nail, nobody has taken the trouble to figure out what it costs to get along with a poor equipment and wind for a motive power.

The foundry foreman who can run a ten-ton heat from a five-ton cupola, hoist an eight-ton casting with a three-ton crane and make a stack of old flasks do for all different kinds of jobs may be handy and the proper person on some occasions, but when it comes to saying that his ability in this respect is a passport to economical production we are placing ourselves on the other side of the fence where there is room for argument.

Kinks and makeshifts have their place only so long as they are profitable. When your competitors make a rigging that will fit the job, all your efforts to make things, that you have on hand, do, is going to carry you so much nearer the pool of bankruptcy. The handy man was a great convenience, so long as nobody undertook to bid against him, but his day in American foundries, except in isolated localities, is gone. He has been counted out in the cold figures of dollars and cents as the imperfect machine has been superseded by something better. He was handy, it is true, but this did not count against perfection. He could turn out a job where managers of to-day could not make a beginning, but the cost of doing so exceeded that of the man who made provision to get around difficulties. He was handy, but not economical. It is not business to get along with nothing.

The Young Man.

Anyone attending the late convention of the American Foundrymen's Association must have been impressed with the comparative youthfulness of the majority in attendance at that meeting.

Improvements in any industry always bring young men to the front. This is not intended to convey the impression that older men are not so capable but rather that age prevents to a certain extent the formation of new ideas. When a man has pursued a fixed method of turning out work for a lifetime, it requires a great deal of personal self-denial to acknowledge that there is something better. The young, on the other hand, are not bound by any tradition or sympathies for the past and proceed to discard, whatever is thought unnecessary, without feeling that remorse over broken ties, which comes to older men.

The successful operation of a foundry to-day requires men with greater managerial ability than formerly, and the young man is confronted with greater chances for making a mark in that industry than has at any other time existed.

Thinking of Things.

Anybody could do that. Any blamed fool could do most of the things we see around us, if we had only thought about it. That is where the rub comes in. People not engaged in the thinking business make up the rear in all vocations.

To be sure, all are not equal, but then thinking, like everything else, is largely a matter of cultivation and growth. You think a little bit now, a little more to-morrow, and before you know it you are thinking all the time, where before your mind was nearly a blank. You see a man doing a piece of work one day, just try and figure out, without saying a word to anybody, how you could improve on his methods. The reason we caution you to keep it to yourself for a while is because, this question of talking is a matter of growth too, and if it gets the start of you, it makes you a blowhead. People who do the most thinking seldom speak out their thoughts as fast as they are made, they give them a chance to ripen and mature, because thoughts, like everything else, are seldom perfect when first evolved. By turning them over weak spots can be detected, and when an opening occurs they are ready for use.

The man who is showing that anybody could do a thing, is the man who never thought of anything. If he had he would speak otherwise, knowing that to think of things is only a specie of work, produced by systematic application. No one is more to be avoided than him, for he begrudges others

the credit due them for what he is unable to do himself. His shout about the simplicity of things is only the echo of an empty mind, too narrow to permit of recognizing what others have accomplished.

Choosing a Recreative Pastime.

In the May FOUNDRY we called attention to the difference existing between workmen and laborers. Our remarks on that occasion have been the subject of some criticism in which our contemporary attempts to show that the reason for so many workmen being in reality nothing but laborers, lays, in the molders' case, in the large day's work put up by them in many shops and which it is claimed prevents them from giving any attention towards bettering their condition.

We know the molder receives his share of honest hard work, although it is a question whether a majority of those for whom a big day's work is claimed are entitled to be considered as molders, but granting that they are, there is just this much that applies to their situation as well as others. The molder who will do the most thinking about his work will get along with the least amount of hard work. It is unnecessary work performed by the average molder which makes his task as hard as it is, and it lays within himself to make mental application spare him from some of his physical efforts.

Our contemporary credits a lack of inclination for self improvement to exhaustion. Just to see how much this actually had to do with the question, we have been making some observations in the neighborhood of a foundry with a national reputation for a big day's work. These observations have all been made during the dog days too. We expected these people to eat their supper and go to bed in order to recover by morning, but such was not the case. Not one of them appeared to realize their state of collapse. Some of them worked with zest in their gardens, others spread themselves out for a smoke while reading a paper, and a number could be found receiving their share of satisfaction from a game of seven up or checkers.

Now all of this is all right and is only mentioned in order to prove that we hold different ideas of recreation. It is possible to cultivate one's own trade in such a manner that what appears to others as work, is in reality recreation. Most men have a hobby, to which they give a certain amount of attention daily, and this hobby becomes a recreation to its owner, and thus the hobby or recreation of one becomes the work of another. The only fault to be found is, that most men fail to make a hobby of their own trade. We fail to see wherein it would be more exhaustive for a molder to lay out the plans for what he intends to do the next day than to try and calculate the moves through a game of checkers. It is simply brain work applied in different directions.

When we cease to regard our trade as something that is forced upon us, as something that we are compelled to do against our will and look upon it in its true light, as a chosen vocation in which we not only find our work but our recreation as well, then the acquirement of knowledge that will enable us to advance and get along with the least possible amount of hard work will be comparatively easy.

It is a common occurrence to find molders damning the day they entered a foundry. It would be the same had they entered any other trade. Instead of cultivating within themselves a desire to form a closer union with their occupation they have given to it only their physical ability, while their mental work has been spent on something else. They have chosen to become laborers instead of workmen.

Getting a Show.

Of all the vast species of humanity by which our planet is peopled no one is more worthy of editorial comment than the ones who are complaining about not "getting a show." To them opportunities are ever in the distance, hard times or good times, it is all the same, disappointments greet them year after year, and while they change their opinion of the cause of ill-luck from monopolies to political corruption they never consider themselves a party to the circumstances which deprive them of the privilege of rising above their neighbors.

It is commonly acknowledged that every man has faults as well as virtues. The percentage of his faults compared to his virtues is what determines the position he shall occupy in the scale of worth. His ability as a good mechanic may be offset by a tendency to inaugurate disturbances among his co-

workers, his desire to shun work on general principles or other disagreeable traits in his disposition. He may be below the average in mechanical ability, and yet his services are worth more to his employer than that of his more able shopmates, because what he lacks in this way he makes up for in honesty of purpose, faithfulness and his inclination to make himself generally useful. He gets a show because his average is, counting all things together, higher than that of his neighbor who may be his peer in some things. Too many good mechanics are passed, just on account of pinning their faith in getting a show to mechanical ability alone. The number of chances for advancement are just as numerous as ever, but they will not be reached by the ones who excel simply in one particular direction. There are many other qualities besides good workmanship essential in getting a show.

Each One Has Troubles of His Own.

The workingman who surveys the plain surroundings in his humble home as he vainly tries to calculate how he can stretch the few dollars at his command so that they will cover his wants is liable to believe himself and kind the ones who bear the greatest part of the world's disagreeable features. As a matter of fact, however, all men are subject to more or less strain in conducting their business, and while the employer may to all outward appearance show an exceedingly happy frame of mind, he, too, is subject to troublous visitations in "the struggle for existence."

The other day one of the most prominent foundrymen in the United States was by circumstances beyond his control compelled to temporarily place part of his business in the hands of receivers. As president of a banking institution, many of his workmen were also his creditors to the extent of their deposits. In the excitement attending such occasions, they, to make matters worse, withdrew their deposits, although without effect, as the embarrassment only reached his manufacturing interests, but the scene was sufficient to show that the position of capital and labor is very easily reversed and that the class of people commonly designated as "laborers" are capitalists as well as common workmen. Numerous instances of this kind are continually reported and they one and all go to attest that everyone has troubles of his own.

No Admittance.

If the shops which plaster themselves with notices to "keep out" merely have in view the object of preventing their works from being overrun with the usual lot of hangers on, who generally manage to stand in somebody's way, their motives may to a certain extent be defended. But if they, on the other hand, intend this as a protection against a leakage of their methods of working they might as well attempt to retain perpetual daylight by closing all crevices.

The ability of a shop to keep itself above par is something that is largely bought with the greatest of legal tenders, experience. We have noticed time and again that competitors strive to secure the services of those brought up in first-class shops, evidently thinking that all who graduate from such places must be possessed of that shop's secret formula of success. If the person who is thus obtained knows nothing besides carrying on a certain work in a certain manner, the experiment is likely to be disappointing. Experience cannot thus be transferred from one to another.

The strength of a shop does not lay so much in its methods, for these can commonly be purloined in one way or another. Its advantage lays in the weakness of imitation, at least that imitation which is founded without the foundation of experience. Shops are modeled after other shops day after day, and yet never reach the eminence of the original, because imitation always leaves out something that is vital to the perfect adjustment of its workings. It is not what is to be seen that makes the successful shop, but rather the unseen, the untold pages of experience which can neither be stolen nor given away.

A Suggestion.

During the recent convention of the American Foundrymen's Association there was a noticeable lack of discussion upon some of the papers presented at the meeting. When we consider how difficult it is to recollect the contents of such papers after hearing them

read but once, the cause of backwardness is apparent.

The American Society of Mechanical Engineers have a rule whereby all papers intended for their meetings must be handed to the Secretary some time in advance of the meeting, at which they are to be read, in order that they may be carefully edited and proofs furnished each member in time for him to become acquainted with their contents. This tends to facilitate the transaction of business at the meetings, as the papers can simply be read by title and the members having familiarized themselves with their contents and determined upon what points to offer discussion are prepared to state their views in a very concise manner.

In this way there can be no reason for members not voicing their true sentiments, as they are placed on par with the author on any subject they choose to take up. As the discussion upon a paper very often becomes more valuable than the paper itself the necessity for promoting discussion is apparent. By making the members of the American Foundrymen's Association familiar with the topics to be discussed previous to the meeting we believe the interest of the members on the questions at issue would be greatly increased.

Krank's Korner.

I notice our venerable friend R. D. Moore takes it upon himself in a recent issue of the "American Machinist" to tell "what the average molder don't know." The things which Mr. Moore enumerates as being unfamiliar to the average molder are fortunately things which it is not necessary for the average molder to know. He might be a better informed molder for knowing them, but he would have to be engaged on more than average work in order to utilize his knowledge.

Incidentally Mr. Moore blames the average man for not knowing some things for which Mr. Moore himself can not vouchsafe an intelligent reply or lay down a rule, invariably applicable. The "time required in a given weight of casting to cool to a solid state" is something beyond mechanical calculation as far as exactness of answer is concerned, because the distribution of metal and other conditions such as temperature of metal and mold will influence the result. "The theory of skim gates" is a dead theory in most foundries and clean castings are produced every day without any connection with skim gates, the theories of which may be very nice on paper but of little use when it comes to preventing dirt from entering the mold.

"If it takes a larger feeding head and what it implies more metal to supply the shrinkage in a two foot shaft than in one of the same diameter ten foot long," what size feeding head will be required for a shaft three inches long?

When Mr. Moore speaks of "ramming the wrong bars in a pulley cope first" he evidently refers to flasks having considerable "rubber" used in their construction. The average molder nowadays is furnished with the best of flasks, while it requires a molder above the average to get along with the wrecks, in fact, one foreman spoke the plain truth when I tried to induce him to get a flask that would hold itself up. "If I had a good flask I would put a cheaper man on it," was the answer, and he was right too.

The sixty years of service which Mr. Moore has seen in the foundry has qualified him to speak with authority on many subjects connected therewith, but looking at his essay on what the average molder don't know, I fail to find wherein he has either benefited himself or the molders. If he had shown them wherein laid their faults and how to overcome them, and the chance for educational work in this respect is large, they would all have regarded him as their benefactor, but simply accusing them of ignorance without suggesting a way of remedying it, can not produce any beneficial result or reflect any credit upon the party who makes the charges.

Pokey's Pointers.

"That Tom is getting to be a regular devil," said Jim Muggins, the new superintendent at Pokey's, as he pulled his chair a bit closer to the old man.

"He ain't getting that way," replied Pokey. "He always was a blamed cuss, anyway you took him. If you don't know how to take him, look out. He will stand a kind of quiet while you are telling him about all the things you don't know, and then when you begin to get out of wind and want him to take his turn, he is liable to say something that makes you feel real bad. I know him, many a time I have wished somebody would kill

him on account of the way he has of saying things. What is he up to now?"

"That is what I want to know. He is acting so infernal contented that I know something is coming."

"A pointer, I guess," said Pokey.

"A what," asked the nervous Jim Muggins.

"A something that makes you feel like somebody had hit you in the ear with a snowball. He used to give Widbur about three a month until that fellow concluded that the shortest way to get through the foundry was to go around it. How did he get a start on you, Mr. Muggins?"

"Well, you see, the first week I was here I happened to go through the foundry by what you call the longest way. Tom Bowers and a fellow he called Coffindodger were using a monkey wrench, a cold chisel, a sledge hammer and an unknown quantity of blasphemy to remove a broken flask pin. They were both swearing under high pressure when I says, 'Let me tell you how to make a flask pin.' 'All right,' says he, 'you are the man I have been looking for.' 'I will show you how they do such things at Ely's in Pewabic,' says I, 'where they have forgotten more than the people of Big Bend ever knew. When a thing breaks,' says I, 'it is because it is not strong enough.' 'My opinion, too,' says Tom. 'Well, if you know that much,' says I, 'why in thunder don't you make your flask pins heavier.' That seemed to floor him, and I kept right on telling him that it was no wonder the foundry business didn't pay with so many green ignoramuses in it.

"That is where I put my foot in it," continued Jim Muggins. "After having the pins made heavier the lugs began to break off. Of course that was worse than having the pins break. But Tom, in a sort of an innocent way says, 'When a thing breaks it is because it is not strong enough.' Now that was throwing my own catechism up to me and I couldn't go back on it. I made the lugs heavier and blame me if the side of the flask didn't break off. Now I think that they are breaking those things just for a purpose out there. The other day when I passed through the alley I heard Coffindodger yell out, 'When a thing breaks it is because it is not strong enough.' I shouldn't be surprised but that they have formed some kind of a conspiracy in the foundry to get the best of me."

"Just let us make a grand jury of ourselves," said Pokey, "and we will go out and cross-examine that smooth Tom Bowers."

"What become of that lot of patent flask pins we got from Omaha a couple of years ago, Tom?" began Pokey, who knew from past experience that it wouldn't be safe to go too fast in interrogating the mysteries of the foundry.

"Our customers got them," replied Tom.

"Why, soak me," said Pokey, "if I remember that. What did we get for them?"

"About two and a half cents a pound, I think."

"And we paid fifteen. If that ain't business. No wonder I am getting poorer every day."

"We got more for them than they were worth," interrupted Tom, who didn't care about hearing one of Pokey's sermons. "They busted and were melted over and I think we got as much out of them as we could hope for."

"Busted, hey. Patent pins, warranted to last a lifetime."

"Patent didn't make them any better, and a warrant on a flask pin is only given by people who don't know what it is used for," said Tom.

"And how about that five hundred we got from the Indestructible Pin Co," asked Pokey.

"The whole outfit is deposited in a barrel behind the core room," answered Tom. "Some day when we run off a heat of hard iron I am going to get rid of them too. Their case is hopeless. When a pin is once bent, its usefulness is gone."

"Well, Tom, what are we going to do for something that won't break or bend? Jim Muggins tells me that when he made a pin that wouldn't break the lugs broke, and when he got that fixed the flasks gave away. Now, how are we going to get around it?"

"Make a flask pin that will break,"

"Make a pin that will break," gasped Pokey.

"A pin that will break," said Jim Muggins.

"Why that is contrary to all precedents, Mr. Bowers. Everybody is looking for things that will last, and in Pewabic—"

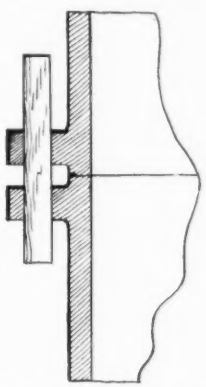
"Precedents cut no figure, neither does Pewabic," retorted Tom, "the best flask pin you can possibly make is one that breaks when you abuse it. It is cheaper to break pins than anything else about a flask. Besides, I believe we can fix things so that there will be no pins to break."

"What is going to guide the flasks, then?" asked Jim Muggins.

"The pins."

"The pins, and there will be no pins to break. That is a new kind of algebra to me, Mr. Bowers," said Jim, who was anxious to show that he knew something, while Pokey was doing his best to caution him by stepping on his toes.

"Pins are the weakest parts of flasks, whether they are made of cast iron or steel, patent or no patent," Tom went on. "They are mostly always broken in shaking out, when everything is hot, and in spite of all



HOW TOM BOWERS WOULD MAKE A FLASK PIN.

care they will snap off now and then. Now it seems to me that if we make our pins so that we can take them out of the flask, when we are through with them, that there will be no pins to break. The trouble with foundries is, that they expect to get a first class pin right out of the sand. Instead of drilling a hole and turning up a pin to fit it they rely on core work to make a good job out of it. If a pin was turned up like this," continued Tom, as he made a chalk sketch on a bottom board, "and each part of a flask simply provided with a lug, through which is drilled a hole, there would be a chance of getting things to fit. When the mold is clamped up the pin can be withdrawn and there is no pin to break in shaking out, or in case a pile of flasks should fall down. Make the lugs heavy enough so that if a pin should be left in, it would break without doing any other damage. What takes time now is to get the old pin out of the way and a new one put in, in fact, it costs more for labor and bolts to fix one pin than what it would cost to turn up ten pins this way."

"What do you think about that, Jim," said Pokey, as he turned around toward that individual.

"And what is going to stop the pin from sliding clear through the lugs?" asked Jim.

"Either cast a projection on your flasks or let the molder run a wedge between the lower portion of the pin and the flask, while he is ramming up the mold," answered Tom. "These pins can only fit one way, and if they are there when you lift off or close a flask that is all you want."

"It will be work for the machine shop, it seems to me. Besides, I can't get it through my head, that the way to make flask pins last longer is to make them weaker."

"If an hour's work in the machine shop will save ten in the foundry, why not yank it through that way. Plain, round cast iron pins, did you say, Tom?"

"Yes sir; and another thing, when we make up a lot of flasks, get up a template and make them interchangeable. This thing of making one of one size and the others something else, and painting numbers on them, all looks very fine when the flasks are new, but when the numbers get wore off there is the dickens to pay. Interchangeability is what has cheapened the cost in all trades, why shouldn't it do so in the foundry?"

"I guess it will, Tom, if we go at it right," answered Pokey, as with a squint of his eye towards Jim, he said, "Mr. Muggins is going to show us some of the things they do in Pewabic."

The Bryant Molding Machine.

By HENRY HANSEN.

When, at the beginning of the present year, descriptions of a molding machine, capable of making two hundred and ten radiators per hour began to be published in some of the trade journals and the newspapers of the town in which the invention was being perfected, I said to myself: Here is another

scheme that will eventually cause some sucker to get his fingers burned. I did not doubt for a moment but that a machine could be made to perform the needed operations, since I have always contended that there is hardly a movement made in making a mold that can not be duplicated by mechanical means, but I did seriously doubt the ability of such a machine to withstand the unfavorable conditions found in a foundry for any delicate mechanism. I have personally taken a hand on more than one occasion, in making records with molding machines, and my past experience justified me in the belief that the amount of work credited to the machine was simply for exhibition purposes and made at the expense of speeding both human beings and machine up to a point that could not be maintained under actual conditions.

Then, too, radiator molding in this country has been reduced to very nearly a science, and it is doubtful if this branch of founding has a competitor worthy of the name outside of stove founding. So great has been the advancement within but a few years, that the output per man has more than doubled, and permitted the substitution of an inferior class of labor. Taking all of these things into consideration, I did not believe that machine molding could materially reduce the cost of molding in this case. I had been a witness to and a participant in previous attempts to turn out this class of work with molding machines, and had practically become convinced that hand labor was in the end the cheapest.

When I therefore had the pleasure a few weeks ago of visiting the Bryant Iron Works at Buffalo, the builders of these machines, it was with misgivings that I accepted their offer to investigate everything connected therewith fully and to ask any questions which might suggest themselves. Before going there I had memorized a great string of objections which I expected to find with their machine and such as I had learned from contact with other attempts at machine molding. The great majority of these questions never left my memory because there appeared no reason for asking them, so that in one sense of the word my visit was disappointing, since I could not locate the objectionable features I had so confidently expected to find.

When the manager of the works insisted upon showing me the machine in operation I thought I should see a lot of men "breaking their necks" in an effort to demonstrate how fast the "thing" could be made to go. When, therefore, the manager called out a number of machinists from the machine shop (the foundry being closed, as the firm is not engaged in making radiators), I said to myself: You nobby looking machinists, as a rule, have a soft snap to what us hard-working molders go through, but here is a chance where you will earn your money. Again I was disappointed, the machine was put in operation, made the speed with which it has been credited and not a mother's son of those machinists, amateurs to a certain extent, sweat enough to look as if they were working at all.

The cores used in radiator castings are commonly made without rods, in the place of which a great number of small chaplets are substituted, the number employed in each casting of the size, which I witnessed the molding of at Buffalo, would be at least 18. Those made on the Bryant molding machine are made without chaplets in the strict sense of the word, since the arrangements for keeping the core in position are formed in conjunction with the making of the core. This would naturally tend to slightly increase the cost of the core, though this is more than offset by the saving of both time and material in the dispensation with chaplets.

Although the past practice of making radiators has developed a system that must be conceded to be without a peer, yet it can not, as a whole, approach that uniformity in quality of output reached by the Bryant Molding Machine. The successful operation of this machine on radiator castings is sure to be followed by specially constructed molding machines for other castings.

The machine operates automatically throughout and continuously. From the time the flask is placed in position on the table until it is automatically raised clear of pattern not a hand touches it. With such machines an assured fact, what will the coming "Modern Foundry" look like?

The proprietor can seldom understand why his molders kick for more heat, while the nickel plated radiators in the office send the mercury up to 80.

Prominent Stove Founders.

CHARLES S. PRIZER.

The youngest man ever selected to fill the responsible position of president of the National Association of Stove Manufacturers was chosen at the last convention held in Detroit.

Charles S. Prizer was born in East Nantmeal village, Chester county, Pennsylvania, April 26, 1860. His early years were spent on his father's farm and his formal education was limited to ten winters' attendance at a country school.

In April, 1876, he entered the office of Orr, Painter & Co., Reading, Pa., as assistant book-keeper, where he remained until July, 1882, when he became a traveling salesman for the Buckwalter Stove Co., of Royersford, Pa., three years later securing a similar position with the Smith & Anthony Stove Co., of Boston, Mass.

In 1886 he purchased an interest in the Reading Stove Works of Orr, Painter & Co., and in 1889 was elected secretary of that corporation, a few years later, 1892, becoming president of the same firm.

Mr. Prizer has been secretary of the Stove Founders' Association of Eastern Pennsylvania for the last seven years, and is also president of the Furnace Manufacturers' Association. He is a director in the Wilkinson Shear Co., of Reading, Pa.

Outside of the stove business Mr. Prizer devotes his time to the study of political economy. He is a free-trader and believes that the interests of the manufacturers of the United States would be promoted by the abolition of all commercial restrictions. He is also an advocate of the gradual adoption of the single tax plan of raising all public revenues as proposed by Henry George. He takes an active part in Democratic politics and is leading such a busy life that he has never found time to get married.

CHAUNCEY H. CASTLE.

The Stove Founders' National Defense Association at its late convention elected as its president, Chauncey H. Castle, president of the Comstock-Castle Stove Co., of Quincy, Ill.

Mr. Castle was born in Adams county, Illinois, July 10, 1843. Becoming imbued with the spirit of war he left college at the age of eighteen and served under Sheridan until after the battle of Chickamauga, when he was mustered out on account of wounds received, part of which he carries to this day as a memento of the severe engagements in which he took part.

He returned to Quincy and entered the employ of Comstock, Castle & Co., of which firm his father, T. H. Castle, was a partner. Within two years he became foreman, later manager, and upon the retirement of S. H. Emery, in 1879, he assumed the entire management of the company.

Mr. Castle has been a member of the executive committee of the Stove Founders' National Defense Association ever since its organization, and much of the success attained by this body is due to the persistent efforts he has made in its behalf.

The Ridgway Oil Governed Air Hoist.

To the man who has ever had a chance to use a hydraulic hoist all other hoisting appliances seem inappropriate. Owing to the cost of installing a plant for successfully working this system and the unfavorable climatic condition existing in our manufacturing centers which interfere with its operation, attempts have been made to employ other mediums with varying success.

The slight compressibility of water has made it above all others the ideal element for use in the foundry. It is here that steam and air alike have failed to show that steadiness to be found in hydraulic hoists. Owing to the compressibility of the latter elements their use for hoisting has been accompanied with more or less "jerking" calculated to exasperate the most phlegmatic molder. The chief fault found with direct acting steam and air hoists in the foundry has been in lifting and lowering copes or other parts of molds and in drawing the patterns, where the least jerking is often capable of inflicting considerable injury. For the other parts of foundry work such as taking out castings, transferring empty flasks, etc., it has answered admirably, but as separate hoists are not provided for delicate work the air hoist has suffered condemnation in foundry service, because of its jerkiness, even if this fault has been ever so small.

Wm. H. Ridgway, of Cootesville, Pa., who is well known to our readers in connection with the Ridgway Steam Hydraulic Crane, wherein he, so to speak, "took the jerkiness and uncertainty in action out of steam," has recently perfected an air hoist in which he claims to have overcome the only objection that has been uttered against the air hoist—its jerkiness. The action of this hoist is governed by a small quantity of oil, which, it is claimed, makes its operation as smooth and steady as can be secured.

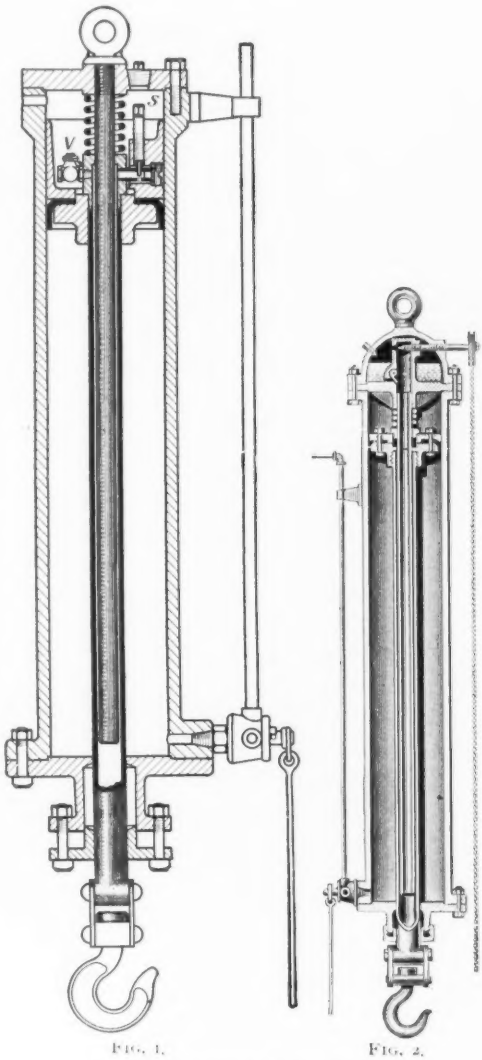


FIG. 1. FIG. 2.

DIFFERENT STYLES OF HOIST.

Figure 1 is a sectional view of the Ridgway Air Hoist. Externally it does not differ from the ordinary hoist. Internally, however, the piston rod is larger than usual, and is made hollow. To the top head of the cylinder a solid bar is rigidly fastened, which is strong enough to hold, without bending, the full

force of the hoist, it passes through a tight bushing in the piston and enters the hollow piston rod, which it fits very freely. The top of the piston is made in the form of a cup, in which there is a passage-way to the interior of the hollow piston rod, the opening of this passage being controlled by the screw valve S. There is another opening to the hollow rod controlled by the small swinging check valve V, which opens toward the rod.

If oil be poured in the cup-shaped piston it will pass through the check valve V and fill the hollow piston rod. If the hoist is down, the hollow rod full of oil, and the screw valve S is tightly closed and a full head of air is thrown on the hoist it is evident the hoist will not move at all on account of the incompressibility of the oil. The whole force of the hoist will be taken by the bar fixed to the top head.

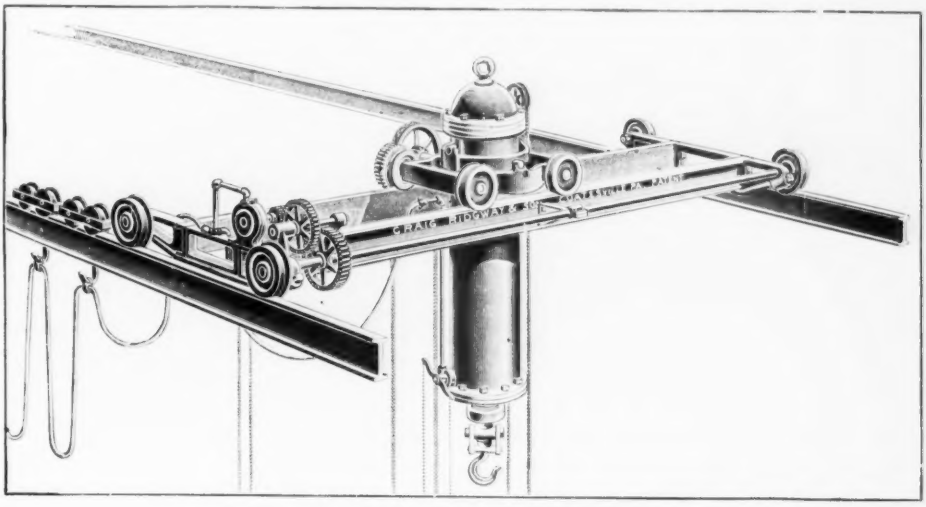


FIG. 3—FIFTEEN-TON HOIST ON TRAVELING BRIDGE.

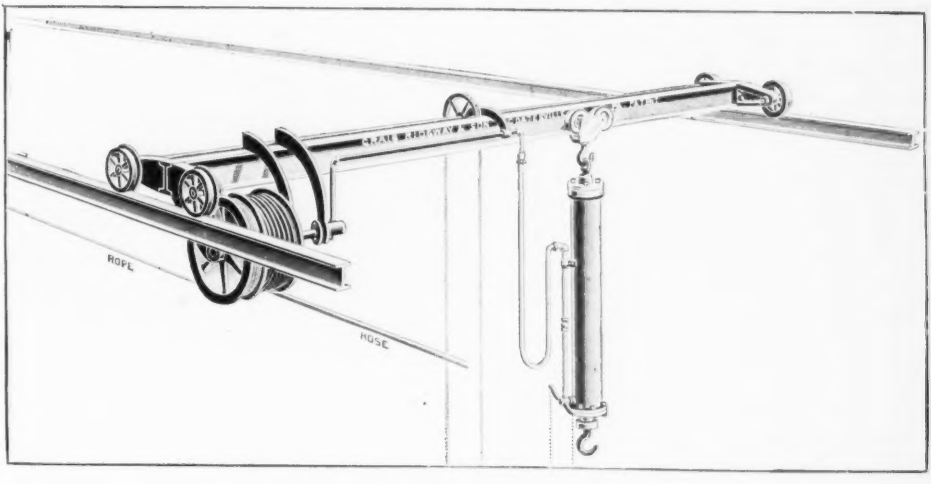


FIG. 4—ONE-TON HOIST ON TRAVELING BRIDGE.

If, however, the screw valve S be slightly opened so the oil can escape from the hollow rod into the cup on the piston, the piston will rise, but only as fast as the oil can pass the valve S, and no faster.

It makes no difference to the motion of the hoist how the air is admitted to it—

gradually or suddenly, little or much—this motion is governed entirely by the passage of the oil through the valve S, and is always gentle, smooth and regular, and at any speed at which it may please the owner to set it by the adjustment of the valve S. If the operating valve is accidentally or carelessly thrown open when no load is on, or a chain should break with full head of air on, the piston can not shoot up, but only moves as fast as the oil can pass the valve.

In the hoist just described the speed can only be changed by access to the valve S, with a wrench, through an opening in the top head. This style of hoist answers for general work where a certain good-working speed having been decided upon, it is not often changed.

For many services, and especially for foundry duty, it is desirable to have the hoist arranged so that the speed can be varied at a touch and that quickly.

Fig. 2 is a sectional view of the hoist in which this rapid regulation can be accomplished. In this machine the fixed bar is also tubular, as well as the piston rod. The top head of the piston is enlarged to form a small reservoir. Inside of it is the opening from which the oil can escape from the hollow piston rod. This opening is controlled by a screw valve, the stem of which is extended and carries a small sprocket chain wheel, from which a light hand chain hangs within easy reach of the operator. The opening in the piston, through which the fixed bar passes is packed with a leather cup in such a way that the pressure of the oil keeps it tight.

If in foundry service it is desired to draw a difficult pattern from the sand, the hoist having been attached to the pattern, the screw valve is closed and the operating cock is thrown wide open, admitting the full pressure of the air. The hoist does not move because of the presence of the oil in the rod. While the men are rapping the pattern the screw valve is slightly opened, barely enough to trickle through, and as it does so the hoist rises with a perfectly smooth, regular and gentle motion which is scarcely perceptible. The rapping still continues, and as the pattern leaves the sand the motion can be surely, positively and uniformly increased without the slightest shock or jar by the further opening of the screw valve until when the pattern has entirely cleared the sand full speed may be given.

Air hoists can be mounted in almost any desired way, the most common plan being to carry them upon traveling bridges, swing cranes and run ways.

Fig. 3 shows a 10-ton hoist upon a traveling bridge. The cylinder is hung in a carriage and travels laterally upon the bridge, being moved by a pendant hand chain. The bridge is traveled by a Drake air engine, or it may be arranged to travel by hand. The crane is connected to the air supply at one end of the run way by hose. This hose is carried in festoons by small trucks traveling upon one of the tracks of the run way. Often it is carried above the crane on a special track and slides are often used instead of the trucks. As the crane travels in one direction the hose is stretched out one loop after another. As the crane moves in the opposite direction the little trucks are pushed ahead and gather up the hose.

Fig. 4 shows a traveler of two tons capacity carrying the hoist upon the lower flange of a single I beam. In this the hose is wrapped upon a reel, the air being taken in through the hollow axis of the reel. The hose is attached to the air supply at one end of the run way. A cord is run from the reel to the opposite end of the run way. The pull of the hose unwinds it from the reel as the crane moves in one direction while the pull of the cord winds up the hose as the crane moves in the opposite direction.

Pittsburg Foundrymen's Association.

The regular monthly meeting of the Pittsburg Foundrymen's Association was held in the Builders' Exchange, Pittsburg, Monday evening, June 28, with President Taylor in the chair.

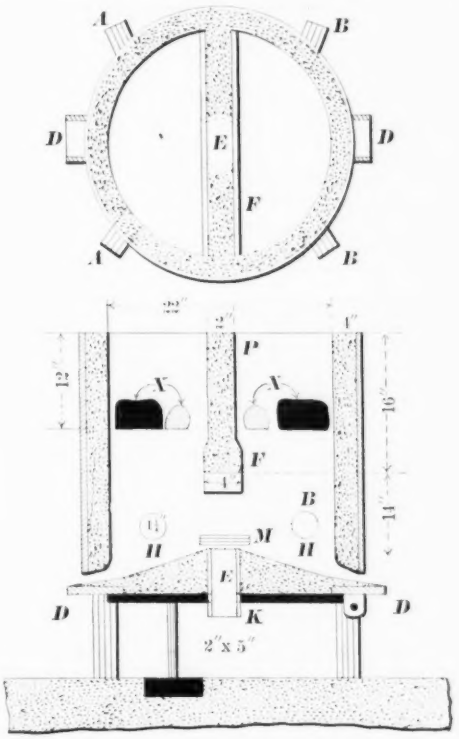
Mr. Thos. D. West read a paper on the

"COMPARATIVE FUSIBILITY OF FOUNDRY METALS."

In the advance of founding to a basis of greater exactness and assurance of successful workings, it is often as essential for us to have information on the fusibility of the metals that we make mixtures from as to know the effect of one metalloid on another in changing the physical character of iron. This is realized when we consider how

easily a formulated mixture can be prevented from giving calculated results by one metal having a lower fusing point than another when charged in a cupola.

While this is a subject of importance to the general and heavy-work founder, who is often called upon to take several different grades out of a cupola at one "heat," it is also of importance to the specialty and light-work founder, who may be changing irons or may not have a correct analysis; for when he knows that one combination of certain metalloids requires greater heat than some others,



WEST'S COMPARATIVE FUSION TEST CUPOLA.

he is in a much better position to decide whether it is the iron, atmosphere, blast, fuel, mischance, or his own mismanagement that makes the cupola irregular in its meltings, so that it produces "hot iron" one day and "dull iron" the next, with resulting bad work or heavy losses in castings.

Believing that it is often as much the particular combination of the metalloids as the physical character of the iron which causes grades of iron to differ in their fusibility, I decided to experiment to learn, if possible, the effect of different combinations of the metalloids on the fusing point of iron. In searching for appliances that would give reliable data I failed to find anything satisfactory, and therefore set to work to devise something that would meet the requirements and at the same time withstand criticism. One objection I have to past methods of testing the fusibility of metals is the failure to provide conditions similar to those in actual founding. For example, I feel confident that the gases emanating from the fuel when combined with the blast have an effect upon the chemical constituents of metals. I have studied out the design of cupola illustrated, which is an original arrangement, so far as I know. The method adopted gives only comparative results and does not show the degree of heat required to fuse any of the metals. Observations may be made and conclusions derived from them as to the difference in the time of melting which any grade of metal requires over another, when the two kinds of iron are charged in the respective sides shown. It will appear on examination that like conditions prevail in both apartments, and that if one grade starts or comes down quicker than another, we know it to have a lower fusing point. By a series of such tests we are in position to formulate a scale, showing the combinations of metalloids requiring the highest heat, with the relative gradations of others down to that most readily fused, a table I am now laboring to originate.

The comparative test cupola shown is not an expensive affair and is such as might often be a valuable adjunct to the laboratory of metallurgists, blast furnaces, foundries, etc., besides being useful in the production of small castings, of one mixture, or any which it may be desirable to make of two separate grades of metal. As an example of what may be done in this line, I would call attention here to the casting before you, which is 2½x4x6 inches, one-half of which is cast of remelted steel and the other half of a high silicon or a very soft grade of cast iron. This cupola is also useful in other lines. For instance, the other day we found it necessary to have a much harder iron in replacing a worn out 36-inch worm gear wheel, than our regular run of specialty iron would give us. Instead of taking the chances of contaminating part of the regular heat

with a foreign mixture, we put in the regular form of a straight slanting sand bottom leading down to one tap hole, in the comparative test cupola, Fig. 1, started the fire and charged on about 120 pounds of scrap steel and white pig iron (broken to small size) promiscuously in both sides of the cupola. When all was ready, the blast was put on and in three taps we caught the metal in a hand ladle, pouring it into about 300 pounds of iron from the regular heat, which was held in a crane ladle standing in readiness for its reception. The time of this heat was about ten minutes from the putting on of the blast. The value of this to founders who occasionally, or even at every heat, may want a few castings possessing a harder mixture or a softer one than the regular heat needs no comment.

In designing this cupola I arranged for a center blast, besides having outside tuyeres on the plan shown. This permits of the greatest possible uniformity of combustion throughout the area of the cupola and affords every opportunity of regulation should the heat, from any cause, be greater in any one portion than in another. This regulation is secured by diminishing or increasing the volume of blast by valves attached to branch pipes, not shown, leading to the tuyere openings A A, B B and E. It may be asked, How is it possible to know when there is perfect uniformity of heat all over the cupola area? This is indicated by the color of the flame emanating from the open top of the cupola. If any difference should exist there, in the top area of either side, the eye will detect it as quickly as the steel maker can note changes taking place in a Bessemer converter by means of the spectroscope.

In operating this cupola the sand bed is put in with two slanting bottoms, as seen at H H, thus preventing either metal, as it comes down, from mingling with the other. The center tuyere has three pieces of ½-inch round iron laid over its opening, as seen at M, to prevent the fuel from dropping into it and stopping its blast passage. Good kindling is used up to within, say, 12 inches of the top. On this, coke broken to egg size is then placed. The coke is poked down as the fire burns until there is a solid bed of live coals up to within 12 inches of the top. If the metal to be fused is of a light character, or easily melted, it is then charged at this height; but if it is heavy or hard to liquefy, then the bed of live fuel should extend up to about 9 inches of the top. As this cupola has ample tuyere area evenly divided, it will be found to work best with what would be termed a "mild blast." The blast is started slowly, increasing the volume gradually for the first two minutes until all the force advisable is on. The tap holes at D D are left open so as to permit the metal to flow out as fast as it melts, thus allowing a record to be made of the metal's first and last appearance. Of course, should the cupola be used simply for the purpose of melting to get metal to pour a casting, it could be then stopped and tapped the same as any cupola used in ordinary practice. If the cupola is employed for testing the comparative fusibility of metals, it will require about six men to operate it—one for timekeeper, one to charge on fuel evenly and poke it down, so as to preserve a solid fire until the iron is about half down; one at each tap hole to keep it open, that the metal may flow freely; and then, if the metal is to be caught into molds, one man on each side to take away the filled molds and replace empty ones. If the cupola is only to be used to obtain metal to pour a small casting, or to record the time of fusing by letting the metal down into a "pig" as it comes out, then two men are sufficient to operate it. In charging any metal for a comparative test, care must be exercised to have the "bed" of fuel the same height on both sides, also to have each grade of metal as near uniform in size as possible, and evenly charged. After this, coke is filled in until the cupola is stocked to its brim, when it is ready for the blast.

The first test heat we made, as seen by Table 1, consisted of 150 pounds on each side, it being put in with 50 pounds in two charges after the "bed" of 50 pounds was on. This plan was found to be objectionable for comparative testing, as it showed wherein errors might easily be made by reason of uneven charging, the escaping flame making it too hot for the charger to do good work. After this "heat" no more metal was charged than the "bed" could well carry, thus permitting all iron to be carefully charged be-

fore the blast went on. The plan adopted in these tests was to make at least two casts of each grade, the first being that of the metal in its original state, each grade being broken to uniform size as far as possible. This, in being melted down, was run into molds that gave blocks weighing about 15 pounds each and in size 2½x4x6 inches long. For the second cast of each grade these blocks, in the larger "heats," would be broken in two pieces, but where there were only three blocks for each side they would be charged whole. The idea of running the first cast or "heat" of pig metal or scrap into blocks was to obtain metal that would be closely uniform in size and weight, the better to insure like conditions in making a comparative test—an important requisite. This appears in Table 1, in the columns marked alternately "Pig" and "Block."

Up to the time of writing this paper I have made 19 comparative casts, but only give results of eight of them here, for the reason that in the case of others I desire to make experiments that will involve much time, and that should be compiled with the second series to give completeness to the results in that line of inquiry. As the first series of tests is distinct in showing what effect low silicon and high sulphur has upon the fusibility of iron, as compared with high silicon and low sulphur, with the carbon and iron closely constant, I have permitted the appearance of this paper at the request of our secretary. The purpose is, also, to start other investigations in the same lines, so that when my second paper is ready its subjects can be discussed from the standpoint of regular shop experience or observation. By way of suggestion to any interested in this new line of research, I will outline fields which have so far opened themselves to my mind. What I am giving you in this paper is under the head of "Comparative Fusion Tests of High and Low Silicon and High and Low Sulphur Irons." That which I have outlined so far for my second paper will comprise comparative tests under the following heads: Second series: "Fusion Tests of High and Low Carbon Metals." Third: "Fusion Tests of Steel and Cast Iron." Fourth: "Fusion Tests of Wrought, Malleable Iron and Cast Metals." Fifth: "Fusion Tests of Ferro-Silicon, Manganese and General Founding Iron." Sixth: "Fusion Tests of Extremes in High and Low Phosphorus Irons." Seventh: "Fusion Tests of Iron, when the Carbon is in a combined form (Chilled or White Iron), or Graphite form (Non-Chilled or Grey Irons), with all the other metalloids constant."

It is to be understood that in making note of shop experience, observations or tests, the physical nature of the metals as well as their chemical composition is to be detailed.

The importance of this work will be the better understood when it is stated that at the present time our enthusiastic and able co-worker, Mr. S. S. Knight is laying claim to tests proving (the question of the metalloids influence never being entertained) that soft grades of all irons will melt down faster than hard irons. The contrary has chiefly been my experience, and appears to be the general expression on this question. Still, I hold, as stated in the early part of this paper, that results are often affected by combination of the metalloids, as well as by the physical character of the iron, and I believe my second paper will bear me out in this assertion. As this paper is carrying me to a greater length than I expected, I will close by presenting the following Tables Nos. 1 and 2, and comments on the character of the irons used. I desire here to thank Dr. R. Moldenke, the able metallurgist of The McConway & Torley Co., malleable iron founders of Pittsburg, for the valuable assistance he is giving in this work by furnishing metals and complete analysis of any irons I have thought necessary to have analyzed in carrying on these experiments. I also desire to thank Mr. D. K. Smith, chemist of the Alice Furnace, Sharpsville, Pa., for aiding in the work as timekeeper and taking a close record of each "heat".

Referring to the above tables, attention is first called to the analyses. The column under A is that of hard iron in heats Nos. 1 and 2 of Table No. 1. B is that of a white iron used for heats Nos. 3 and 4. C is that of a mottled iron used for heats Nos. 5, 6, 7 and 8; while D is the analysis of a soft iron used as a constant, to present a contrast to all the hard irons, throughout the eight heats. It may be stated that drillings for analysis were all taken from the blocks as they came from the first casts of the original pig or scrap metal.

In all the "heats" the hard iron is seen to have come down first, excepting in one case

which is found in heat No. 6, and that the flow of hard iron ended soonest in all the heats. Thus as far as these tests go they show that hard iron will melt faster than soft. While I desire to reserve for my next paper any comments as to cause and effect in relation to the chemical composition of these irons, I will say that the irons used correspond in their analysis to irons employed in general founding; and whatever my next paper may show as to results, this paper goes to confirm the general impression existing among founders that hard iron will melt more readily than soft grades, in using the terms "hard" and "soft" as they are generally accepted. For all this, I am of the opinion that we can have a combination of the metalloids wherein the softer iron would be the first to melt. Whatever the results found in the varified experience of broad founding,

TABLE NO. 1.

COMPARATIVE FUSING TESTS OF HIGH AND LOW SILICON AND LOW SULPHUR IRONS.

"Heat" Nos.	1	2	3	4	5	6	7	8
Blast turned on....	1:55	1:35	2:13	2:08½	4:21	1:56	1:44	2:26
Harder iron running	1:57	1:39	2:21	2:12½	4:27	2:02¼	1:50	2:32¾
Softer iron running.	1:57¾	1:40	2:21 1-6	2:13¼	4:28	2:02	1:50½	2:34½
First mold of harder iron filled.....	1:59	1:42	2:24	2:16	4:31¾	2:06½	2:55	2:37¾
First mold of softer iron filled.....	2:01	1:43	2:24	2:15½	4:32¾	2:07	2:55½	2:38½
Second mold of harder iron filled.		1:43	2:26	2:17	4:36	.....	2:57	2:40
Second mold of softer iron filled..		1:44	2:26	2:16½	4:38¾	.....	2:58	2:41
Third mold harder iron filled.....		1:44	2:27½	2:17⅓	.....	.....	.....	.....
Third mold softer iron filled.....		1:45	2:28	2:17¾	.....	.....	.....	.....
Harder iron all down	2:19½	1:49	2:37½	2:18	4:37	2:09½	2:02¾	2:47½
Softer iron all down	2:22	1:50	2:39	2:18½	4:40	2:11	2:05	2:48½
Form of iron charged	Pig.	Block.	Pig.	Block.	Pig.	Block.	Pig.	Block.
Weight of iron charged each side.	150	65	100	54	40	35	64	50
Time of melting....	25m.	11m.	16½m	6m.	13m.	10m.	15m.	15⅜m.
First iron to melt..	Hard.	Hard.	Hard.	Hard.	Hard.	Soft.	Hard.	Hard.
Time exceeding its mate.	45s.	1m.	10s.	45s.	1m.	15s.	1m 30s	1m 45s
First iron all down.	Hard.	Hard.	Hard.	Hard.	Hard.	Hard.	Hard.	Hard.
Time exceeding its mate	2m 30s	1m.	1m 30s	30s.	3m.	1m 30s	2m 15s	1m.

TABLE 2.

CHEMICAL ANALYSIS.

Analysis Letter.	A.	B.	C.	D.
Total carbon.....	4.25	4.03	4.15	4.10
Graphitic carbon.....	2.07	1.76	1.94	3.92
Combined Carbon	2.18	2.27	2.21	.18
Silicon	.85	.92	.99	2.70
Sulphur	.21	.19	.17	.03
Manganese	.18	.17	.26	.34
Phosphorus	.192	.129	.655	.085
Iron by difference.....	94.32	94.56	93.77	92.74

as to the fusibility of metals, it is to be remembered that if we desire accurate knowledge of cause and effect we cannot ignore chemistry in this line any more than we might now think to do so in formulating our mixtures of iron. And I believe the day is coming when we shall consider reliable data upon the comparative fusibility of our irons to be often of as much value as a knowledge of their chemical constituency.

An interesting discussion followed the reading of the paper. Dr. Richard Moldenke contributed the following:

"Long experience with the melting of iron in Siemens-Martin furnaces having given me the impression that hard irons melt faster than soft ones, and knowing this to be the accepted view among the trade, I was not a little astonished to see claims advanced insisting on the contrary. At the time, I thought it likely to be owing to some radical difference in composition of the irons that were used, and was therefore more than pleased to hear Mr. West advance the idea of making comparative tests to settle the matter definitely. It has remained for him to devise a most excellent system of melting to accomplish this result, and I for one have been much interested in the working of this 'twin shaft cupola,' if I may so call it. It will give us a ready means of comparing the fusibility of the required brands of iron going into our cupola charges. The few words I have to add relate to the melting of iron in the open-hearth furnace, where there is obviously no difficulty due to the rate of melting,since everything charged is supposed to make up a bath of uniform composition.

"I made two experiments, charging simultaneously in each case two pigs of equal weight and shape, one being soft, the other hard. It will be observed that in the open-hearth furnace, filled up with a charge just melting down, these two pigs thrown on top of the white hot metal, and in the full heat of the furnace, could be closely watched with the aid of blue glass spectacles. In the first experiment I was surprised to find the soft pig melting first. It became soft and could be broken up by a bar, behaving much like plumbers' wiping metal when it is just soft enough to be worked. This soft pig when thus crushed down looks like silver, and makes one wish for time and opportunity to study the characteristics of the carbons while in this state. The hard pig, on the contrary, retained its form remarkably well, not disintegrating as the soft one did, the melted portions dropping off like water. Further investigation developed the fact that the soft iron, which melted first, was about 55 points higher in carbon than the hard iron. Mr. West, in his second paper, will go into this question fully, as he is making extended experiments in this line.

"The other trial was with two irons of the same brand, shape and weight, but running in composition, thus:

	Soft.	Hard.
Total carbon	3.66	3.77
Graphite	3.37	.68
Silicon	.75	.44
Manganese	.33	.23
Phosphorus	.126	.140
Sulphur	.02	.02

"These irons, you will notice, differ only in the silicon, and the consequent proportioning of their combined and graphitic carbons. In melting the above pigs of iron under exactly the same conditions, the hard iron went in first. It held its form well, but in melting ran like water, and was melted before the soft iron was half gone. This soft iron melted sluggishly, and did not hold its form while melting as well as the hard iron. It was very interesting, even if trying to the eyes, to observe the whole process, and now that Mr. West has gone into the matter so thoroughly, we will be certainly able to crystalize our ideas and know that we may look for in making up important charges."

Mr. E. A. Kebler, of Matthew Addy & Co., in connection with his remarks on the subject presented some correspondence he had received in 1892 on this subject. A letter from W. S. Unwin, dated Kensington, London, April 12, 1892, is as follows:

"The statement that white iron is more fusible than gray iron has often been made. For instance, in Bloxham's 'Metals' ('Text Books of Science'), page 39, we have: 'The larger proportion of metallic iron contained in the gray cast iron causes it to require a higher degree of heat before it begins to exhibit signs of fusion, but it is capable of becoming very liquid. . . . white cast iron, on the other hand, is softened at a rather lower temperature.' Then this is applied to explain the formation of gray iron on

page 45: 'The production of white iron, when the supply of fuel is deficient, has been plausibly referred to the lower temperature of the furnace.'

"Now I doubt this theory, and though I have not a fixed opinion either way, I don't think the evidence for the lower fusing point of white cast iron is satisfactory. I think the statements are very much due to a theory about the infusibility of pure iron (right, no doubt) and a theory that gray iron is a mixture of pure iron and carbon. In fact, gray iron is a complex alloy in which silicon is essential. I cannot find that the temperatures have been directly observed.

"Truly yours,

"W. C. UNWIN."

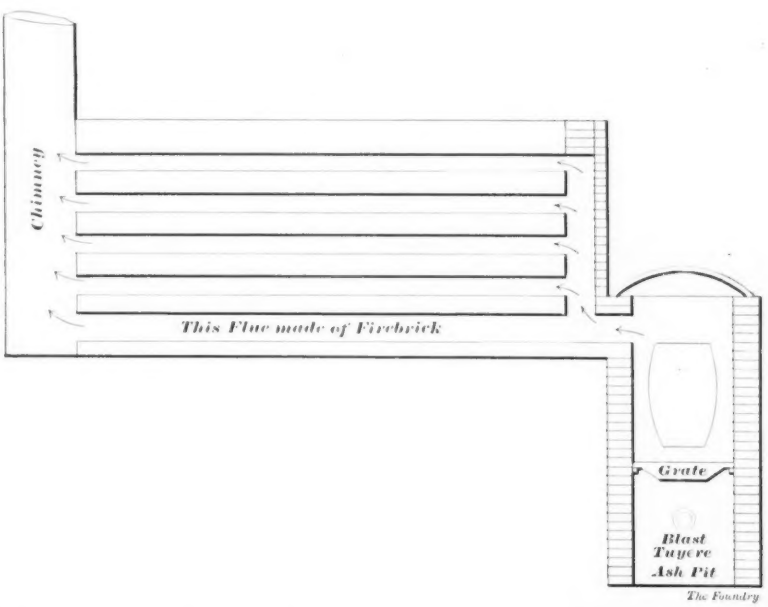
Mr. Kebler recalled the statement of Bell that the temperature of molten iron suitable for steel making is about 2,192 degrees F., and in the same connection read a letter from F. W. Clarke, chief chemist of the United States Geological Survey, in which the latter cited the melting points of various metals as given by Le Chatelier, as follows, substituting Fahrenheit for centigrade: White cast iron, 2,075 degrees; gray cast iron, 2,228 degrees; soft steel, 2,687 degrees; half soft steel, 2,651 degrees; hard steel, 2,570 degrees. Highest heat of Bessemer converter, 2,984 degrees F.

After some further discussion, in which Mr. West urged the members to take a hand in experiments along the line suggested, the meeting adjourned. It was decided that no meetings be held in July and August, and that the next meeting be on Monday evening, Sept. 27.

Questions and Answers.

CORE OVEN HEATED FROM BRASS FURNACE.

I believe we have such an arrangement of brass furnace and core oven combined as would suit your correspondent, N. H. F. The sketch will illustrate its general appearance, with the exception that a damper in the chimney is not shown. Our core room is up stairs, there being three molding floors below. The bottom flue is made from firebrick, the others being iron. The oven is provided with a cast iron front, and divided into different compartments. Width of oven 4 ft. 6 in., length 14 ft. 8 in. Our crucibles are lifted out by means of a cable pulley located on a six-foot track over furnaces.



Montreal, Que. C. M.

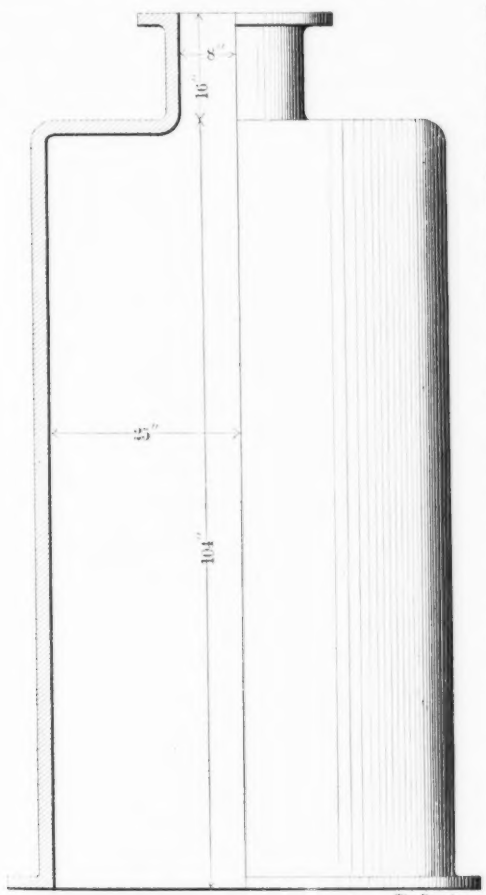
MODERN BRASS FOUNDRY.

Editor THE FOUNDRY.

Please ask your readers to give their ideas of the best method of building and equipping a modern brass foundry. ENQUIRER.

THE ECONOMICAL WAY TO MOLD A RETORT.

We have a great number of castings to make,such as are shown in the accompanying illustration, which gives the principal dimensions. The casting is 1½ inches in thickness throughout, and we would like to have it made in green sand if practicable. We would esteem it a favor if any readers of THE



FOUNDRY who have had experience on similar work would give us their opinion, preferable with sketches, as to the best way to proceed, the main object being, wi'h whatever method of molding is thought best, to produce these castings in the most economical manner.

H. & Co.

It is easier to count flasks than castings. Molders are men, sometimes they are considered machines.

Fletcher's Process.

By S. S. KNIGHT.

While attending the late convention in Detroit the author was asked to write a paper for the Philadelphia association by Mr. H. Evans, of Paxton & Co., who will need no introduction to the foundrymen of the United States. On returning the limited time at my disposal forced me to send to Mr. Evans an incomplete and unsatisfactory paper on one of the most deserving and meritorious inventions which has come forward in the foundry business within the last decade. Since the time the paper was read, so many inquiries have been received by the writer that he feels it his duty to attempt a full description of this new process, which will from all present indications, in the near future, cause the entire disuse of hay-rope and other combustible substances which are now being employed in the construction of pipe cores.

The little advancement which had been made in pipe founding since the inauguration of the vertical method of casting pipe, had been of such prominence that all connected with the business had long awaited the announcement of some scheme for improvement by which the old methods could be replaced by those more economical and efficient, but it happened that while so much interest was being taken in the production of steel and the more refined products of iron ore very little if any attention was paid to the cast iron industry.

The Bessemer, open hearth, Harveyizing processes, etc., appeared without any counterparts in the cast iron industry. It will thus be seen that the steel business was soon placed far in advance and whatever investigation was made in cast iron related almost solely to the properties of the finished product to the exclusion of the improvement of the methods used in the manufacture.

In the pipe making branch of the foundry industry especially was this particularly true and in no department was it more noticeable than on the core floors. It will be understood that in order to have the bars or barrels draw easily, a layer of combustible material must be placed concentric with and directly adjacent to the exterior surface of the iron bar upon which the core is made.

Hay rope had been found to be not only easily combustible, but also to withstand the heat of the oven used for drying the cores; it thus had come into extensive use and although somewhat expensive, was on account of its efficiency retained, but competition and the consequent decrease in the price of the finished product resulting therefrom, had forced foundries to greatly increase their output while yet retaining the same number of employes in order to be able to successfully withstand the active competition, and where from 90 to 100 pipe had been considered a day's work for twenty-five men ten years ago, now two-thirds of the force must daily manufacture double the number of pipe. In order to be able to do this, they must have the best of facilities which modern science can procure, but some obstacles remained invincible to all mechanical approaches. Thus four-inch pipe required core bars not more than two inches and a half in diameter and since these were not less than thirteen feet long, the troubles arising from their being bent were proportionately great. In many shops such bars were made solid, being fluted on the sides, but even then the inability of the core-maker to keep them in line caused many defective castings. The labor of putting up such small size cores was greater in proportion to their size than that required to put up the cores for a larger sized pipe; these points will be remembered and subsequently referred to quite frequently.

A number of years ago Dr. M. H. Fletcher, of Cincinnati, began experimenting with a view of doing away with the hay rope now used in the manufacture of pipe cores. After years of patient work he has at last given to the foundry trade a method as efficient as it is economical and one which now stands perfected in all minor details.

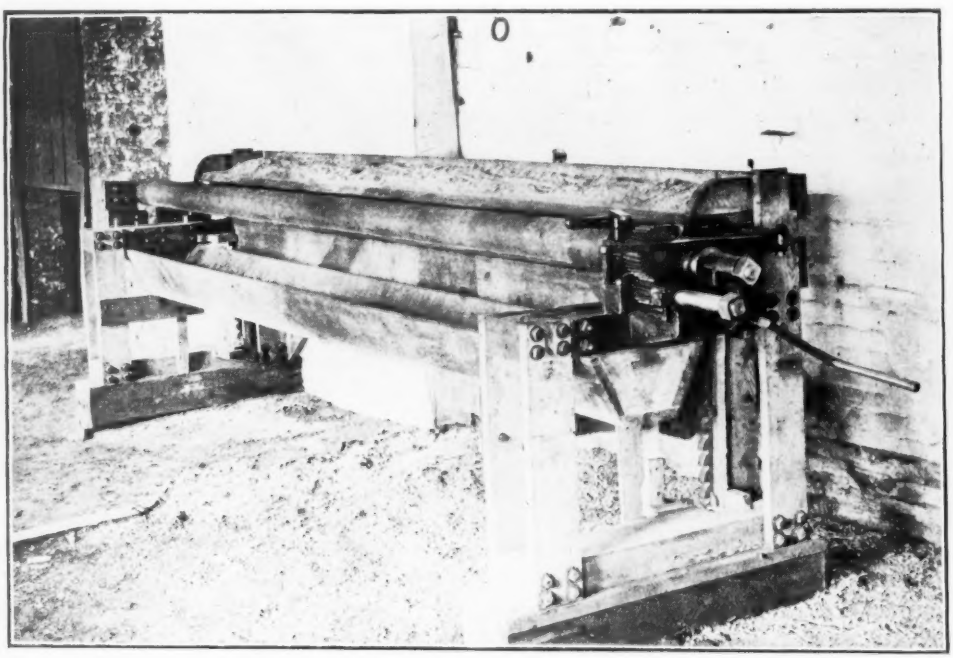


FIG. 1.

It is to be regretted that more complete views cannot be shown of the machine which the inventor uses in covering the core-bars; however, the two views here shown will give some idea of the mechanism and will materially help in explaining the actual operation of the process.

Figure 1 is a full-length view of a machine for making six-inch cores, taken from in front of the end to which the power is applied that turns the core-bar and thus applies the combustible layer to the exterior surface of the bar.

It will be seen that a crank is provided for communicating motion to the bar and also to the two rolls on either side only one of which is shown in the cut. The hopper for holding the material will also be noticed as well as the trough for catching the liquid that is squeezed out of the material applied to the bar by the gauze. In this manner fully 25 per cent of the liquid used is saved which in a day in a large foundry amounts to a considerable sum. The cog, which fits into the bar slides on the middle shaft and thus leaves the bar free to be raised from between the rolls by merely tightening the shown and in the lower center the suspended weight for tightening the gauze.

The method for using this process is very simple and extraordinarily adapted to the capacity of the average foundry laborer or pit man. In place of the hay rope ordinarily used a coating of sawdust, which has been previously mixed to a paste with a 2 per cent solution of hydrated starch is applied to the exterior surface of the core-bar or barrel by means of an open meshed web which passes from one roller under the core bar and on to another roll of the same size on the opposite side; motion is given to the two rolls and bar

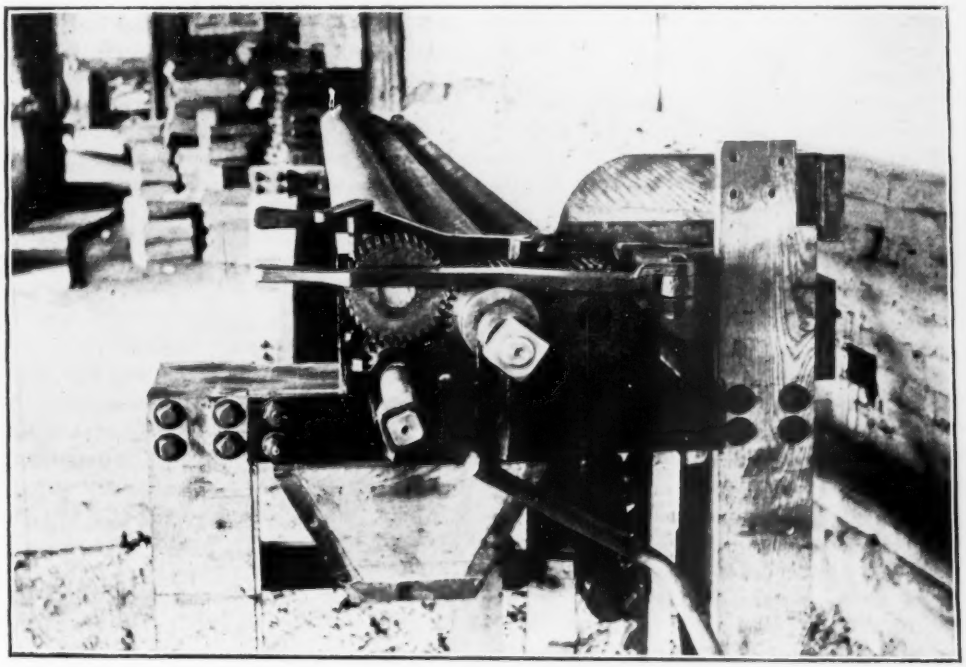


FIG. 2.

gauze, which is done by pushing in the roll suspended below and giving a single turn to the crank. The coated bar is now ready to be lifted out of the machine on the carriage upon which it will be run into the oven and dried. This drying takes no longer than the time ordinarily required to dry the first coat consisting of loose hay or hay rope and clay covered with core dirt.

Figure 2 is a view taken from the end and shows the bar in position ready to be covered.

The lever and catch for holding the bar in place while the machine is in operation is which are directly connected together by means of spur cogs, by a crank, while at the same time the rolls are turned the material is fed in from above from a hopper which is slightly inclined away from the roll so that the hydrated starch solution will not run out and thus leave the sawdust dry. A single turn of the bar suffices to give it a firm coating of sawdust from which the starch solution is largely squeezed out, and which when dried in the oven furnishes a solid foundation upon which to place the last and only coat of core dirt which is the same thickness as the finishing coat now so generally in use.

In actual practice it has been found to be by far the most economical way to make the before mentioned starch solution, by either using a submerged steam coil in a tank of water, or by injecting live steam directly from an open pipe; if the latter method is used the amount of condension which takes place from the injected steam must be taken into account or else the solution will be too weak to render efficient service. From one hydrating tank situated in a convenient part of the foundry a one-inch pipe may be run to any core board desired, and thus the sawdust and hydrated starch mixed only as it is needed. It has been found that if the solution is allowed to stand over twenty-four hours it greatly deteriorates, due to the action of bacteria upon the starch itself. It is easy to judge, however, how much solution will be required for a day's work and the supply regulated accordingly, but if too much has been made it may be kept an indefinite time by adding two ten thousandths of 1 per cent of formaldyde, which may be procured from any manufacturing chemist for $1 or less per pound.

Since it is necessary to have on small cores a layer of combustible matter of only a quarter-inch or less it will at once be seen that a correspondingly larger size bar may be used, than with the old process; this not only facilitates the putting up of cores and increases the percentage of good pipe obtained, but also materially prolongs the life of the bar. Anyone familiar with pipe foundry work must have noticed the corrugations which are so plainly discernible on the inside of many of the larger size pipe, and which were caused by the partial burning of the hay rope, while the first coat was being dried in the oven; it will also be noticed that such corrugations are impossible with this new method, since a solid coating of combustible material is applied. If too hot a fire is used in drying of course the sawdust will burn off the same as hay rope will, but this advantage will be noted over the hay rope process—that if such is the case it can at once be seen since the sawdust coating is not covered with clay or mud while the hay rope must of necessity be inaccessible.

The number of bars which stick or refuse to be drawn due to the mud which reaches the bar through the spaces between the turns of hay rope, every one connected with a pipe foundry must have noticed. This occurrence is absolutely precluded by the use of this new process since a uniform coat is applied to the entire exterior of the bar. One other feature which should not be overlooked is the facility with which pipe made by this process may be cleaned, since no clay is used in the core dirt; in fact, where now so much cutting and chipping are required to free the pipe from dirt, the dirt used by this process may be washed out by a strong jet of water under high pressure, or by simply rapping the pipe with hammers.

The savings which have already been enumerated are amply sufficient to give this method prestige over any method previously employed which has come into general use, but before concluding a few remarks might be aptly made upon incidental savings which have not as yet been noticed. On the cost of a six-inch core 80 per cent is saved by the use of this method, since it has been actually found that the cost of making a six-inch core by this process is less than 1 cent while as put up with hay rope and the usual amount of mud, the same core would cost not less than 5 cents. This saving will include one-half the cost of running the mills to manufacture the mud, and the entire price of the hay (excepting the offset by cost of sawdust) as well as the expense of spinning it into rope. While not less than five minutes are now required in putting on the hay rope and mud on a six-inch core, less than one minute will be fully adequate to do the same work with this new process. The amount of heat required to dry such a core will be about the same in both cases. Since no clay is used in the construction of the core, the time required to clean the pipe made by this process will be far less than half that previously spent in doing the same work.

Any practical foundryman will appreciate the saving which this will make in the construction of pipe cores, but it would be necessary to see it in operation in order to fully discern its merit.

Among the Foundries.

Tyler's foundry at Fredericksburg, Va., has resumed operations.

Ives Bros., of Sturgeon Bay, Wis., are reported to be unusually busy.

The Hillsdale (Mich.) Furnace & Foundry Co. have occupied their new foundry.

The Pacific Iron Works, of Bridgeport, Ct., are unusually busy on marine work.

The Bristol Bell Co., of Bristol, Conn., will occupy their new shops by August 15.

The Auburn (Me.) Stove Foundry Company will reopen their plant in August.

An addition will be built to the Johnstown Radiator Works at Moxham, a suburb of Johnstown, Pa.

The Bussey & McLeod Stove Co., of Troy, N. Y., have recently made extensive repairs to their foundry.

The Wheland foundry at Chattanooga, Tenn., is reported as intending to increase the capacity of its plant.

W. E. Mess, of Charles City, Ia., has lately made extensive improvements in his machine shop and foundry.

The Prairie Stove Foundry operated by A. H. Springer at Terre Haute, Ind., is to be enlarged in the near future.

The Moline Scale Co., of Moline, Ill., is reported as contemplating the increase of their plant in the near future.

Robert Heal has accepted a position as foreman with the lately organized foundry company at Hutchinson, Minn.

The National Brass and Iron Works, of Reading, Pa., intend to build a brick addition, 33x120 feet, to their plant.

The Summit Foundry Co., of Geneva, N. Y., are erecting four buildings, one 30x100 feet and three each 36x190 feet.

Graham Bros., of Newark, Cal., will erect an addition to their foundry, 40x60 feet, part of which will be used as a pattern room.

The Valdosta Foundry & Machine Company, Valdosta, Ga., have begun the erection of new works, which will be 190x215 feet.

The Fowler Radiator Manufacturing Co., Johnstown, Pa., intends building a large addition to its wareroom for storage purposes.

The Otis Steel Co., of Cleveland, O., are casting a steel gun to determine the possibility of using this material for heavy ordnance.

The A. M. Duncan Foundry & Machine Works, at Green Bay, Wis., are reported as intending to increase their facilities in the near future.

J. Olson for a number of years foreman of the Fort Scott (Kas.) foundry, has accepted a similar position with the Carthage (Mo.) Foundry & Machine Co.

The Derwent Foundry Co., at Ellwood, Pa., has resumed operations after a shutdown of nearly five months, caused by the destruction of its plant by fire early in the year.

J. F. Atkinson & Son, of Marshalltown, Ia., have secured a contract for the building of the foundry and machine shop to be erected in connection with the Iowa state college at Ames.

James McGloughlin will remove his foundry from Laconia to Manchester, N. H., some time during the coming fall. It is understood that he will secure increased facilities at the latter place.

The Neill Stove Manufacturing Co., Portsmouth, O., broke ground lately for an addition to their mounting room. This will give them a mounting capacity equal to the work of twelve more molders.

The New York Car Coupler Company has been incorporated at Elizabeth, N. J., with a paid-in capital of $100,000, furnished by the following stockholders: George T. Whyte, of Jersey City; Grove D. Curtis, of Harrington, N. J., and Ira A. McCormick, Walter F. Blaisdell and Joseph W. Blaisdell, of Brooklyn.

Otis Stebbins, of Worcester, Mass., who for four years held the position of foreman in the foundry department of William Allen & Sons' boiler works, and for 25 years previous held similar positions in the Crompton and Colvin foundries, has leased the foundry at the C. D. Morse Manufacturing Company's plant, formerly conducted by the Millbury Foundry Company, at Millbury, Mass., which will be put into immediate operation.

Fire Fiend.

Haight & Clark's foundry at Albany, N. Y., suffered a loss of $2,000 by a visitation of fire July 3.

The Frick company's foundry at Waynesboro, Pa., was slightly damaged by fire June 28. Loss covered by insurance.

The pattern department of the Phoenix Iron Works, Cleveland, was burned out Sunday, July 4. The loss is $15,000 to $20,000, insured.

The Lattimer (Pa.) Foundry Co. was visited by a small fire lately, which was discovered before it secured headway enough to do any damage.

The McCorkell & Hurd foundry at Flint, Mich., was discovered on fire July 3. An alarm was turned in, but the blaze was extinguished before much damage resulted.

The foundry and machine shop of Rauch & Kennedy at Galena, Kas., were entirely destroyed by fire July 9. The plant was valued at from $17,000 to $20,000 and owing to the high rate of insurance only the sum of $4,500 was carried.

Obituary.

JOSEPH McGEE.

Joseph McGee, proprietor of an extensive iron foundry at Long Island City, N. Y., died at his home in that city on July 6, from a complication of diseases. Mr. McGee was born in Ireland in 1847, and when he was 14 years old came to this country, going first to Kentucky and then to Long Island City, where he went to work in the foundry which he subsequently owned.

WILLIAM BELL.

William Bell, one of the proprietors of the Brodhead (Wis.) foundry, was instantly killed Tuesday afternoon, June 22. He was at work with an emery wheel when the wheel burst.

WM. J. COCHRAN.

Wm. J. Cochran, who died in Washington, D. C., June 20, had been in charge of the foundry at the Washington navy yard for several years. He was a native of Baltimore and spent most of his life here. He was the organizer and head of the Baltimore Car Wheel Company, which began operations at Canton in 1872, has partners being Mr. E. W. Robinson and Mr. Hyson. Several years later a stock company was organized to take hold of the enterprise and Mr. Cochran withdrew. He afterward invented a car wheel which he spent some time introducing.

When you find poor flasks in a foundry, the owners are generally complaining about low prices and no profits.

Foundry Elevators and Yard Cranes.*

The foundry is about the last branch of iron manufacturing business to widely introduce mechanically operated machinery. The naturally conservative spirit of the foundryman has, in the past, been fostered by the tendency in large plants to buy the latest machinery for the machine shop and the erecting shop, but to let the foundry (often the best paying branch of the business) get along with what it always has worked with. During the last decade, this spirit, or lack of spirit, has largely disappeared, and all new plants, as well as many old ones, have utilized the most improved power-operated appliances obtainable. This has been true especially in the foundry proper. The molder has been given improved cranes, ladles and molding machines. But there are still some ragged edges. The yard, however, is often sadly neglected, and there the management often satisfies its philanthropic energies by the employment of a large laboring force under the excuse that "a lot of men have to be kept around anyway." Considering the amount of material handled in the average foundry yard and the expenditure of power in hoisting the stock to the charging floor, it would seem that here is one portion of the plant that should receive more consideration.

The elevator portion of this paper will probably not interest those fortunate foundrymen who have located their plant on a hillside and for whom an obliging switch engine gently elevates their iron in car load lots to stockyards level with the charging floor. This is an excellent scheme from the manufacturer's standpoint, but the foundry Mahomet cannot always go to the mountain; so it often happens that the crane builder or the elevator builder must come to the foundry. It is probable also that the foundry of small proportions will be less concerned in the subject than it should be. The scaffold of such foundries is often, too often, reached by leg power and profanity, rather than by mecnanical power and profit.

The old style inclined plane for wheel barrows seems to have declined to some extent, except in antique plants, and in its place the vertical "lift" has for several years

*Paper read by Geo. A. True, Engineer of the Whiting Equipment Co., before the Convention of the American Foundrymen's Association, Detroit, May 10-13, 1897.

held undisputed sway. These machines are of too general use to warrant a detailed description—usually some simple form of warehouse or freight elevator operated by belt, electric or hydraulic power. Of late years the non-freezing qualities of compressed air have largely superseded hydraulic power for the reason that the foundry hoist is almost invariably in a semi-exposed location and the climate is against hydraulics several months in the year. This is probably one reason for the failure of Americans to more generally adopt the simple hydraulic plunger hoists so commonly used abroad.

The ordinary worm or spur geared elevator is familiar to all foundrymen. It should be about twice as heavy throughout as the ordinary "warehouse" or freight elevator of the same rated capacity, for it is generally handled by laborers and is subjected to very rough handling. The spur geared elevator is more efficient than the worm geared machine, especially when used for heavy loads; it is more expensive, too, in first cost. The usual capacities are from one to three tons, with lifts of from twelve to twenty feet. An automatic top and bottom stop is usually provided, and in some cases the platforms have automatic safety dogs, although the short lift often renders these inoperative. The electric elevators are modifications of the belt power machine, the motors being sometimes directly connected and often belt connected. The steam engine types are of similar construction and are of comparatively recent design. The more familiar type of compressed air elevator is an application of the common air cylinder hoist lifting the platform by a wire rope, either simple or compounded, passing over sheaves. This is sometimes modified by introducing the cylinder directly below the platform "plunger fashion." In some localities a hydro-pneumatic or a steam hydraulic combination can be used to an advantage; the water or other incompressible fluid being used over again and again. If water is used it should be mixed with an anti-freezing compound if in an exposed location, or in some cases oil can be used, although the proximity of the hoist to the fire of the cupola makes this generally undesirable. In some cases a jib crane has been adopted to perform the work of an air elevator and to also cover other service. In the paper on "Cranes" read last

George A. True was born in 1863, at Funchal, Island of Madeira, where his father was stationed as United States consul. His early life was passed in Mt. Vernon, Ohio, and at school in Cleveland. His practical engineering experience was begun in the drafting room of the Mt. Vernon Bridge Works. After further practical structural and architectural experience in Kansas City, he removed to Detroit and entered the employ of the Detroit Pipe & Foundry Co. and Detroit Car Wheel Co. as draftsman. In 1889, the officers of these two companies having organized the Detroit Foundry Equipment Co., to manufacture improved foundry machinery under Mr. J. H. Whiting's patents, he was placed in charge of the drafting and estimating department. In 1892, upon the reorganization and enlargement of this company as the Whiting Foundry Equipment Co., and the erection of their extensive new plant at Chicago, he became general engineer and corresponding secretary of the company, a position which he still holds.

Mr. True has given much study to the improvement of the foundry plant and to the development of modern foundry machinery. He has especially given attention to the subject of hoisting plants and crane systems for manufacturing establishments, having designed a number of improvements in this line. He has recently read several papers before various Foundrymen's Associations, treating of the application of compressed air and electricity to cranes and other foundry machines, besides contributing an occasional article to the trade journals.

year by Mr. Outerbridge before this association, a device of this type was described. This crane was supported by a central pillar and had a radius of 30 feet, effectively covering about 2,600 square feet of yard service, in which the pig iron was stored. There are in St. Louis in the works of Harrison-Howard Iron Company and Missouri Car & Foundry Company, yard cranes doing similar work. The pig iron is loaded on special cars, which are hoisted and swung to the platform by steam or electric power, the trucks being then wheeled to the cupola.

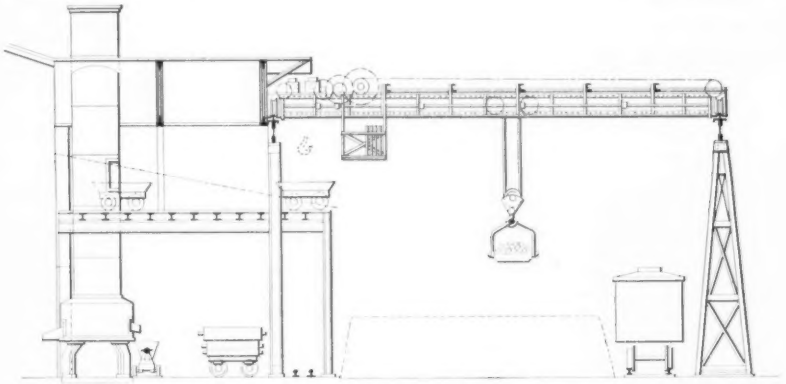


PLATE 1

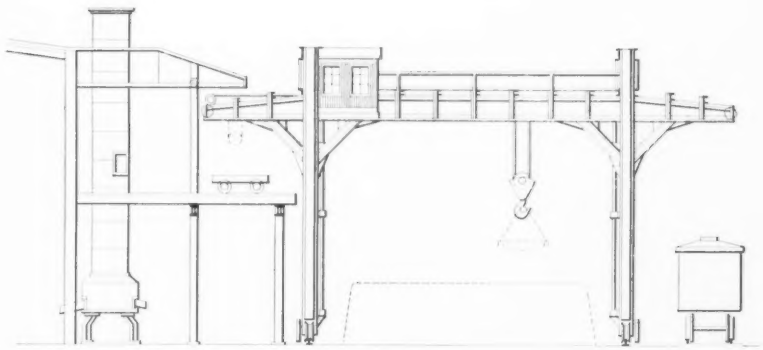


PLATE 2

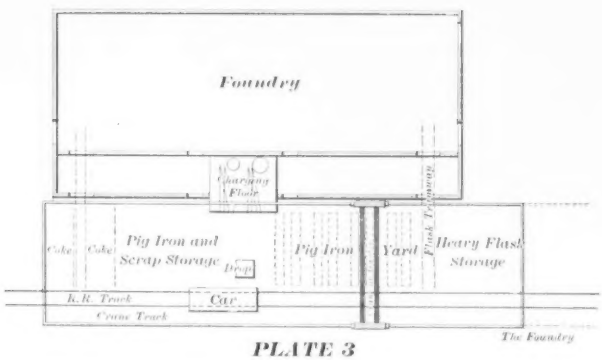
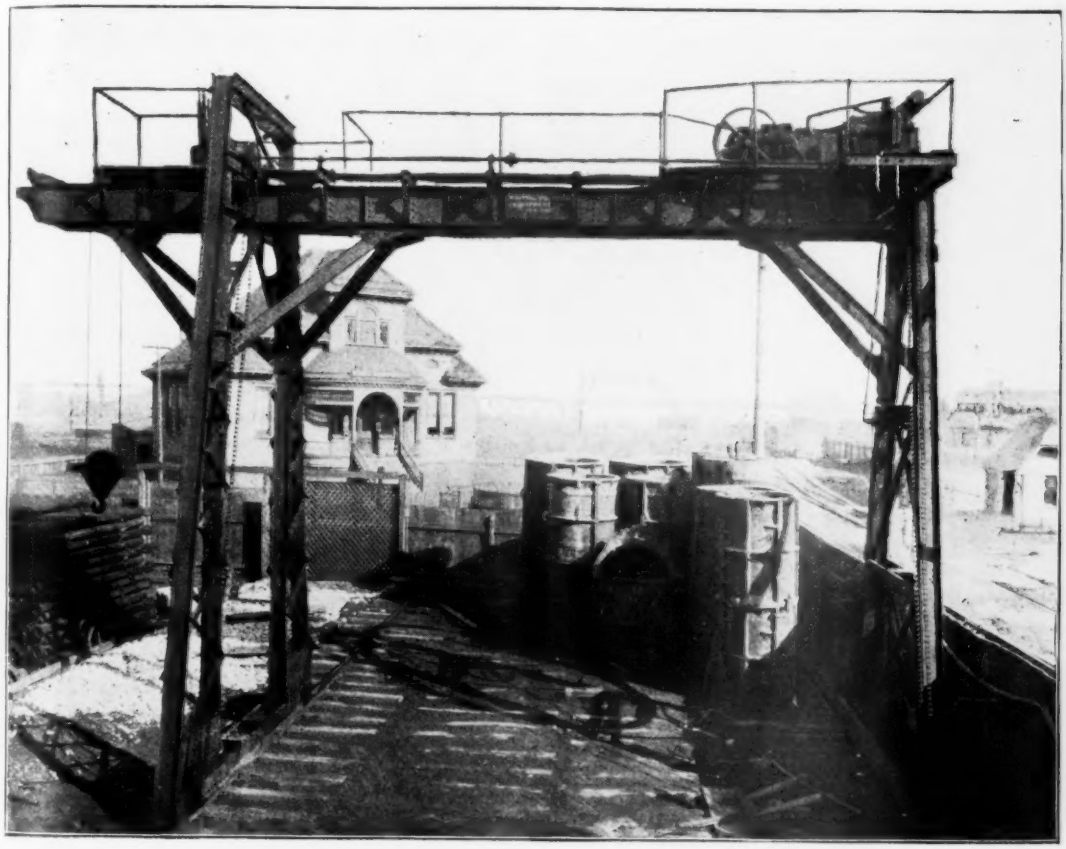


PLATE 3

In the works of the Whiting Foundry Equipment Company at Harvey, Ill., the iron and fuel is hoisted and carried to the charg-

ing floor by means of a conveyer track and trolley running from the cupola across a portion of the stock yards, and over the railroad track, from which the stock is unloaded. The machine is of two tons capacity, and both the trolley travel and lifting motion are operated by compressed air. The height of lift is about 25 feet, and the length of trolley travel over the yard is about fifty feet, with an additional travel in the charging house of about twenty-five feet. The iron is loaded on trays carried by trucks in the pig iron yard, and is moved under the conveyer, which lifts the trays to the charging floor, where they are either deposited on trucks or carried by the conveyer to the cupola.



GANTRY, IN USE BY DENNIS LONG & CO., LOUISVILLE, KY.

This device is in an uncompleted form as yet, the original plan contemplating the extension of the trolley track or bridge another fifty feet or more, and the storage of the pig iron in piles at right angles to and convenient to the line of trolley travel. But in its uncompleted form it has demonstrated its usefulness and versatility. It plays various roles beside that of a charging floor elevator; it serves as an excellent casting breaker or "drop," and it has on numerous occasions demonstrated its value as a loading crane where there was a run of duplicate work within its capacity. Could its range of usefulness have been foreseen when it was planned, the lifting capacity would have been greater and provisions would have been made for its use as a loading and unloading crane for all work up to five tons weight. A similar system operated by belt power was installed in the foundry of Thomas & Son, of Newark, Ohio, several years ago and is still in service.

The ultimate efficiency of such a device and its maximum form of usefulness in serving yard and charging floor is probably embodied in a continuation of the scheme of

which this is a practical beginning; and that is, the adoption of an overhead traveling power crane or traveling gantry to serve the entire yard; spanning the outside tracks, hoisting the pig iron and fuel to the charging floor, doing service as a drop hoister, a loader of moderate weight castings, and a flask crane; and in many plants a crane to unload and distribute the pig iron. Not all foundries have a capacity to warrant the investment, and still fewer have their yards so arranged that such a crane could be used advantageously, but the suggestion is presented for the consideration of those who may contemplate future plants, or whose yards are so arranged that such a scheme can be employed.

The application of a traveling crane for this service, running on elevated tracks, is illustrated in cut No. 1, and the adaptation of a traveling gantry on surface tracks to work of this kind is shown in cut No. 2; while an outline plan of the system, applied to the foundry yards above referred to, is shown in cut No. 3. The method of transferring the flasks from the yard crane to the shop, on surface tracks, is indicated, as well as a proposed plan for transferring the castings from the shop to the yard crane.

The half-tone cut shows a gantry recently installed in the plant of Dennis Long & Co., of Louisville, serving the flask yard, with one overhanging arm which may be applied to the charging floor service. The gantry shown is of five tons capacity, the length of girder is 42 feet, the gantry travel being over 300 feet. It is operated by three independent compressed air engines, and is at present serving a flask yard only. Electricity or any other convenient power could, of course, have been successfully used. The speed for the service under discussion should be high, hoisting light loads to the charging floor at the rate of sixty or eighty feet per minute and traveling 150 to 300 feet per minute.

The advantage of a traveling device over a swinging crane in such service is apparent. The additional ground covered, the ease of covering more area by extending tracks, and its usefulness in handling flasks, as well as loading and unloading in any part of the yard, are considerations which fully justify the increased first cost. The modern pipe foundry yard especially offers a ripe field for such a machine.

The flask yard has long been a much neglected corner of the foundry plant. A few modern and enterprising firms have installed locomotive cranes in this service with good results, although sometimes at a sacrifice of valuable room for tracks. Many use no crane at all and a labor statement taken in some large plants showing the annual cost of handling heavy flasks by muscle would be interesting. Others have a hand power jib crane serving a limited area and necessitating the stacking of flask on flask, involving the interesting and deliberate operation of frequently removing six top flasks to get at the bottom one. An overhead yard crane of high speed and ample capacity can, in the average plant, be made to serve the flask yard as well as the cupola, and have plenty of time left to do duty as an unloader of pig iron and fuel, and a drop hoister or breaker.

In order to allow such a crane to work to its best advantage, provision for some storage on the charging floor should be made, and a multiple system of pig iron trays, or trucks, and coke buckets, should be used, thus avoiding in a measure, the delay at the loading and unloading points. Under such a system no difficulty should be experienced in handling from yard to cupola floor twenty to thirty tons of iron and coke per hour; and a greater amount hourly from cars to pig iron yard. The use of an auxiliary dumping device facilitates the handling of iron from the cars, and by moving the cars to a point opposite the place where the pig iron is to be stored, the trolley travel and hoist alone need be used when engaged in this branch of service.

The suggestion of the paper, in summary, would cover the recommendation of one or more high speed traveling cranes or gantrys for outdoor as well as indoor service in all foundries of large capacity. This necessarily involves the planning of modern plants with a view to utilizing such a crane in as great a variety of ways as possible. Undoubtedly in many large plants two such cranes operating on one track would find ample employment at a good return on the investment.

It is easier to sit in the office, and say, "Do," than to get in the sand pile and "dig."

Transverse Strength of Chilled Car Wheel Metal as Affected by the Relative Directions of Stress and Chill.*

By ASA W. WHITNEY.

The peculiarities of cast iron suitable for any one class of work, notably for chilled iron car wheels, are inviting subjects for study, because the material is not only complex and in general sensitive to chemical and physical conditions, but also because little has been published explaining the anomalies revealed by chemical analysis.

Though the least understood, the most valuable characteristic of cast iron is in reality its apparently anomalous behavior in reference to chemical composition. For instance, one finds that certain compositions, widely different in figures, are, to a valuable extent, chemically equivalent, in that they suffice to produce practically identical physical attributes in the casting. To properly grade iron by analysis in a manner equivalent to the convenient grading by fracture, this point must be appreciated. The present grading is, in general, fundamentally correct, and the chemist must learn it and then subdivide and classify it.

The above statement, however, does not contravene the fact that certain compositions, erroneously assumed to be "practically identical," are hardly to an approximate extent suitable for the same purpose. Every founder finds cases of this kind and chemists have been studying them.

In considering the above points, which have shaken the faith of many investigators in the value of the ordinary ultimate chemical analysis of cast iron, one must not lose sight of the fact that various sorts of compositions differ not only in the degree to which they are affected by physical circumstances, but also are in some cases chemically affected in an opposite manner, which determines a reversal of ordinary phenomena, causing an appearance of liquation or segregation. But a segregated mass differs decidedly in ultimate analysis from the matrix in which it occurs; while in the cases of reversal of ordinary phenomena the differences in the ultimate constitution of the physically different parts are usually no greater than that occurring frequently in an apparently homeogeneous casting. Taken alone, these peculiar compositions are inscrutable, but when tabulated along with certain other compositions in the manner of our tabulations before referred to, they will presumably be found in natural rela-

FIG. 1—TEST BAR FOR CAST IRON WHEEL MIXTURE, CAST IN ALL SAND MOLD.

*Abstracted from the Journal of the Franklin Institute, April, 1897.

tions to compositions of more frequent occurrence.

The "opposite" chemical effect mentioned above consists in the carbon remaining in the combined state in the center of the pig

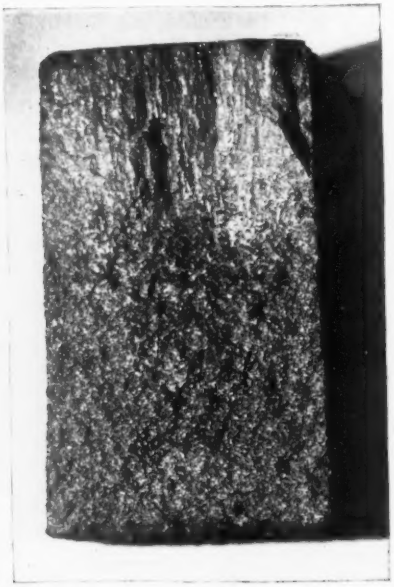


FIG. 2—CHILL TEST OF SAME IRON, ONE SIDE CAST AGAINST IRON BLOCK.

or casting, while separating elsewhere in a freer form, sometimes causing almost as open a grain as a No. 1 foundry iron, but brighter. The white, sometimes very hard, crystalline spot frequently covers one half or two-thirds of the area of the cross-section. Ordinarily, as is well known, hardening or chilling of cast iron is favored by the more rapid cooling at the surfaces, the metal becoming less dense and more graphitic toward the center.

To those who are familiar with chemistry in other departments of art or science, it no doubt appears superfluous to insist that the qualities of charcoal iron, for instance, can be attained whenever its ultimate constitution can be properly attained, whether the elements be contained in coke iron or anthracite iron. But the superstitions of the foundry die slowly, and there is good reason in many cases, as certain qualities are very difficult to regulate. But both strength and chill depend entirely (under given conditions) upon the ultimate constitution.

By the old way of mixing metal by estimation from physical characters, even with the aid of some partial analysis, the founder is limited seriously in the range of metal safe to use and in the range of mixtures possible to produce. Moreover, to reproduce a closely specified quality from new but apparently similar material to that formerly employed is sometimes a matter of several expensive trials.

By the new way the trial mixtures of analyzed material are made on paper and carefully studied out in reference to the foundry conditions, and adjusted until the maximum quality at the minimum cost is assured. The principles of the matter become continually more apparent, as former results are not lost, but are exceedingly valuable, though consisting merely of a record of cal-

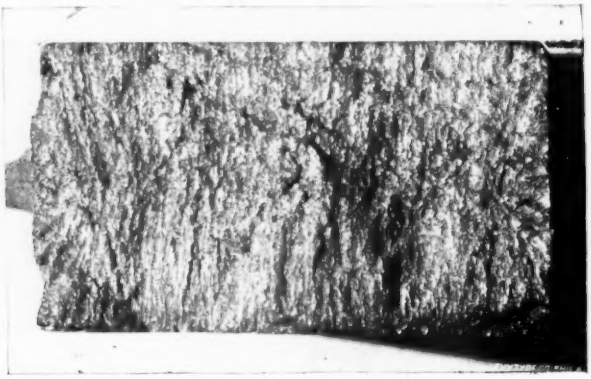


FIG. 3—TEST BAR OF SAME IRON, SAME VOLUME AND AREA AS No. 1, BUT CHILLED ON WIDE SIDES.

culated chemical cupola charges and a few simple but methodically made physical tests of the cast metal. Thus the founder's skill is not wasted on uncertain material, and he becomes interested in more exact cupola practice and careful sorting and sampling of unpromising material.

The economy and success of a proper chemical system of control of mixtures is well proven, as it has been checked by daily noting of regular physical tests for transverse strength, resilience, shrinkage and chill in the case of hard iron, and occasional similar tests of soft mixtures with tensile tests in certain cases, and constant calculation of cost. Since January 1, 1892,

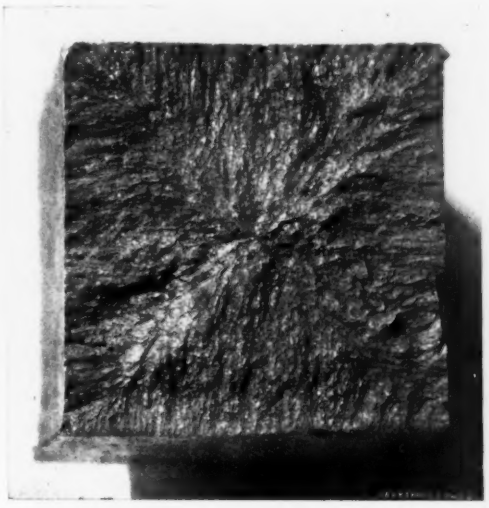


FIG. 4—TWO INCH SQUARE TEST BAR, CHILLED ON THE FOUR SIDES. SAME VOLUME AND AREA AS No. 1 SAME SORT OF IRON.

five regular mixtures, besides frequent special mixtures (the latter often made up at short notice), requirements in fact of a foundry melting 12,000 to 15,000 tons of iron yearly, mainly for car wheels, have been met by this system with far greater certainty, uniformity and economy than ever previously by the old method of experienced estimation of physical characters of a limited and expensive range of material.

Of course, an accurate comparison of the relative merits of the old and new way of making up cast iron mixtures can only be arrived at by taking other tests and expense into account for a year or more. That comparison has been made at our works, and shows for itself on our records with an enormous balance, both physically and economically, in favor of the new way. This improvement has been more marked since January, 1893, when the business passed entirely under the control of interests having full faith in this method.

In March, 1891, daily tests of the transverse strength of the chilled wheel metal were adopted. The bars were cast two inches

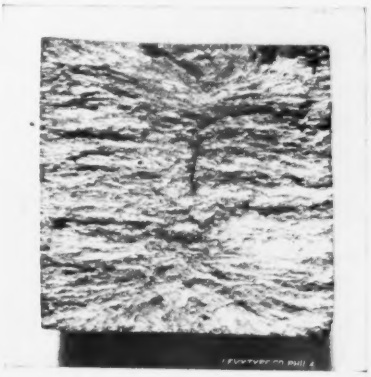


FIG. 5 AND 6—1½ INCH SQUARE BARS, SAME IRON. CHILLED ON TWO OPPOSITE SIDES.

square by fifteen inches long, and were chilled on the four sides (Fig. 4). They, therefore, presented the same appearance in the cross-section as the small ingots, 1 inch square by 4 inches long, devised by Mr. Outerbridge, and illustrated by him in an abstract of his lecture on pig iron at the Franklin Institute, February 6, 1888 (Fig. 7).

That is, the meeting of the crystals, or lines of chill, form a more or less distinct pair of diagonals. The transverse tests of the large bars, as shown by the steady stress of the testing machine, was nearly as erratic as had been the tests of the small ingots by hammer blows, and were of use only

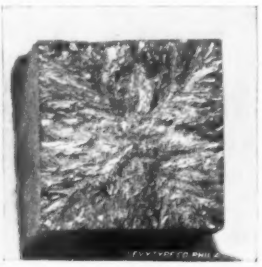


FIG. 7—1 INCH SQUARE INGOT, 4 INCHES LONG, FOUR SIDES CHILLED.

in connection with the gray-bar tests of same metal.

In high-chilling iron particularly, the square bar of 4 square inches sectional area, cast in sand, was found very unreliable as an aid to the development of my chemical method of iron-mixing. Therefore, in January, 1895, I obviated the trouble with hard corners by making them more obtuse and

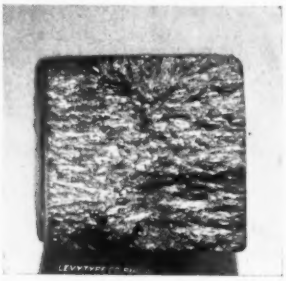


FIG. 8—1 INCH SQUARE TEST BAR, CHILLED ON TWO OPPOSITE SIDES.

adopted a hexagon cross-section of 4 square inches area (Fig. 1). This gives a side of 1.24 inches width to rest on knife edges.

This bar is very satisfactory for a great range of metal, and the large amount of study and tabulation above referred to has been based upon it. I was thus encouraged to make the chilled bar more reliable, and by March, 1895, after several experiments, devised the present very satisfactory form, the results of which are worth tabulating along with those of the hexagon gray bar of same metal. By keeping the same area of cross-section as before (4 square inches), but obtained by the depth 1½ inches and width 2 2-3 inches (2.67 inches), a solid white bar results even with comparatively low-chilling iron. The wide sides of this bar only being cast against a chill, while the edges or narrow sides are in contact with sand, the lines or crystals of chill form straight parallel lines, and meet end to end from opposite sides, and the meeting line being at the neutral axis of the test bar, a slight flaw or incompleteness of chill there only slightly affects the strength. In both bars contraction is measured from small lugs, whose faces are cast against a yoke of 12-inch span —one of these lugs shows in Fig. 3.

All bars are cast on end, and the gray bars are gated at the bottom.

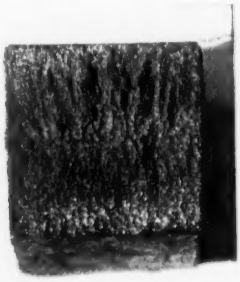


FIG. 9—STRONG, SOFT IRON, 1 INCH SQUARE BAR, CHILLED ON TWO OPPOSITE SIDES.

No change was made in the form of chill tests, which are 2½ inches by 1½ inches by 6 inches, the narrow edge, 1½ inches by 6 inches, being exposed to the iron chiller. Fig. 2 shows the average chill test of such wheel metal as otherwise shown in Figs. 1, 3, 4, 5, 6 and 8.

Contraction is measured from small lugs cast on a corner of hexagon gray bar and on the narrow side of the rectangular chilled bar. The outer faces of these lugs are smooth, as they are cast against a cast iron yoke protected otherwise by sand from the heat of the metal.

The 1½ inch square bars were cast in same molds as the regular flat-chilled bars, but from a 1½ inch square pattern, in order to show the difference in strength of the two positions, merely by comparison of the

breaking stress. For rough comparison this does very well, as when strained across the chill they break at 4,000 to 6,000 pounds, while duplicates broken by a stress in the direction of chill crystals require 9,000 to 11,000 pounds. If the regular flat bar were broken by placing it edgeways, it would not stand over 16,000 pounds, even in the case of a metal like No. 3, which, broken flat, in the strong position of chill, required 17,700 pounds. If the strength were the same in the other direction, 30,100 pounds would be required to break it. Our testing machine not conveniently taking bars of this depth, 2 2-3 inches, the small square bars were more convenient.

Some rather imperfect tests of the crushing strength of such chilled iron show 150,000 to over 200,000 pounds per square inch in what I presume is the weak way. I know of no test made on the ends of the crystals such as the position of load on tread of a wheel. I believe it is much over 200,000 pounds, probably 300,000 pounds at least per square inch.

The wide differences here shown in strength and resilience between duplicates or similar bars of chilled iron practically equivalent though not necessarily alike in composition, broken in one case by a stress at right angles to lines of chill, and in the other by a stress in same direction as lines of chill, are therefore mainly, if not wholly, due to the relative directions of stress and chill. It will be more accurate to understand the word "chill" in the caption of this paper as meaning "the direction of the most rapid dissipation of heat." The physical ef-

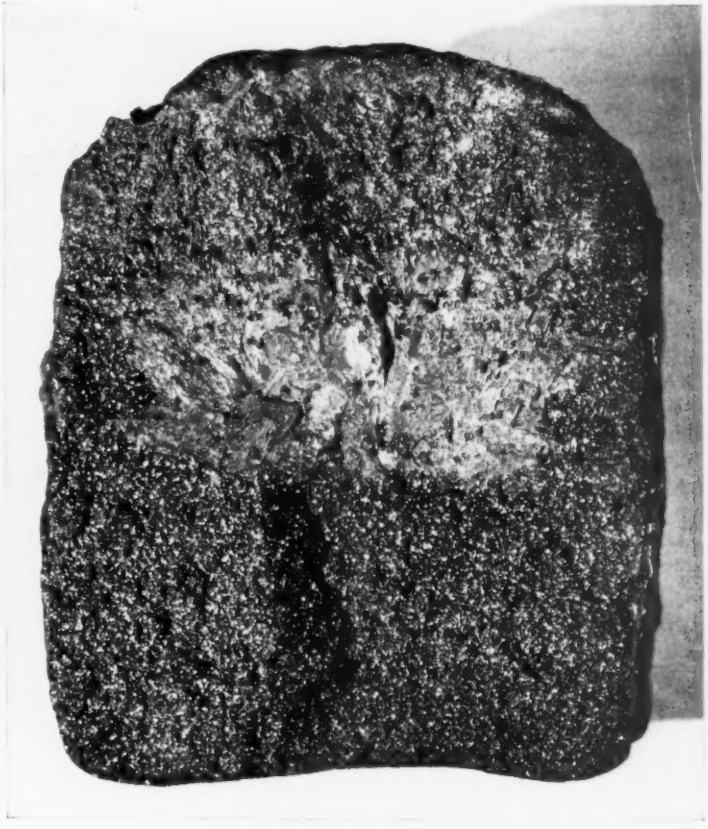


FIG. 10—A GRAY PIG, WHITE IN CENTER. ULTIMATE COMPOSITION OF GRAY AND WHITE REMARKABLY ALIKE.

fect depending upon the composition as well as upon the rapidity of the dissipation, the result is not always totally white iron.

Some of these bars were "rumbled" to see whether in such hard white castings any change in strength would result. In one former case of two 1½-inch bars, which were not cast under the writer's immediate supervision, nor measured, though cast approximately 1½ inches square like those in these series, the rumbling apparently caused 48 per cent. gain in strength, both being reported as broken in the strong position. This case was reported by the writer to Mr. Outerbridge, of Wm. Sellers & Co., in July, 1896, as showing an increase of strength by rumbling even in such iron; but evidently there is an error in that case, as no decided effect is shown in either of the present series.

Mr. Outerbridge has demonstrated the gain made by rumbling in the strength of gray iron bars, and my few experiments agree with his in general. But this uniform white iron is apparently little affected, if at all. It is also the fact that certain strong very homogeneous gray compositions gain less in rumbling than ordinary mixtures similarly cast. But further tests on this point are needed in chilled iron.

The Michigan Stove Co. have issued a special catalogue dealing exclusively with steel ranges manufactured by that firm.

The Fowler & Wolfe Manufacturing Co., of Philadelphia, are sending out an artistic pamphlet describing the advantages of their improved wall and steamship radiator.

The Atlanta (Ga.) Stove Works have placed their catalogue No. 3 within reach of their patrons. The large line of goods described therein augurs well for the development of the Southern iron manufacturing interests.

"Compressed Air and the Clayton Air-Compressors," is the title of the last catalogue issued by the Clayton Air Compressor Works. Besides the usual descriptions of appliances to be found in works of that character, the book contains much information that is new and of general interest to those associated with plants employing compressed air.

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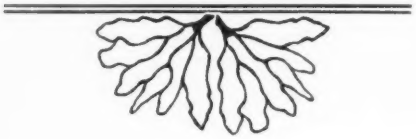

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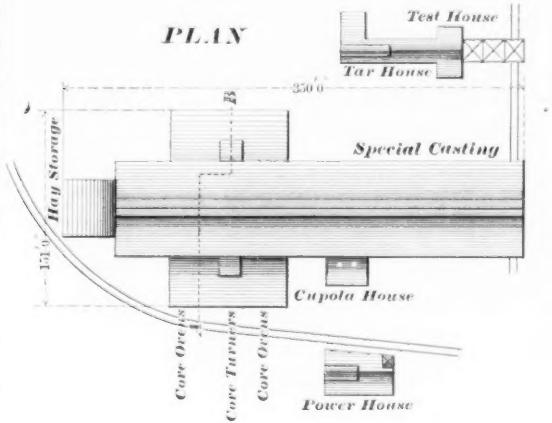

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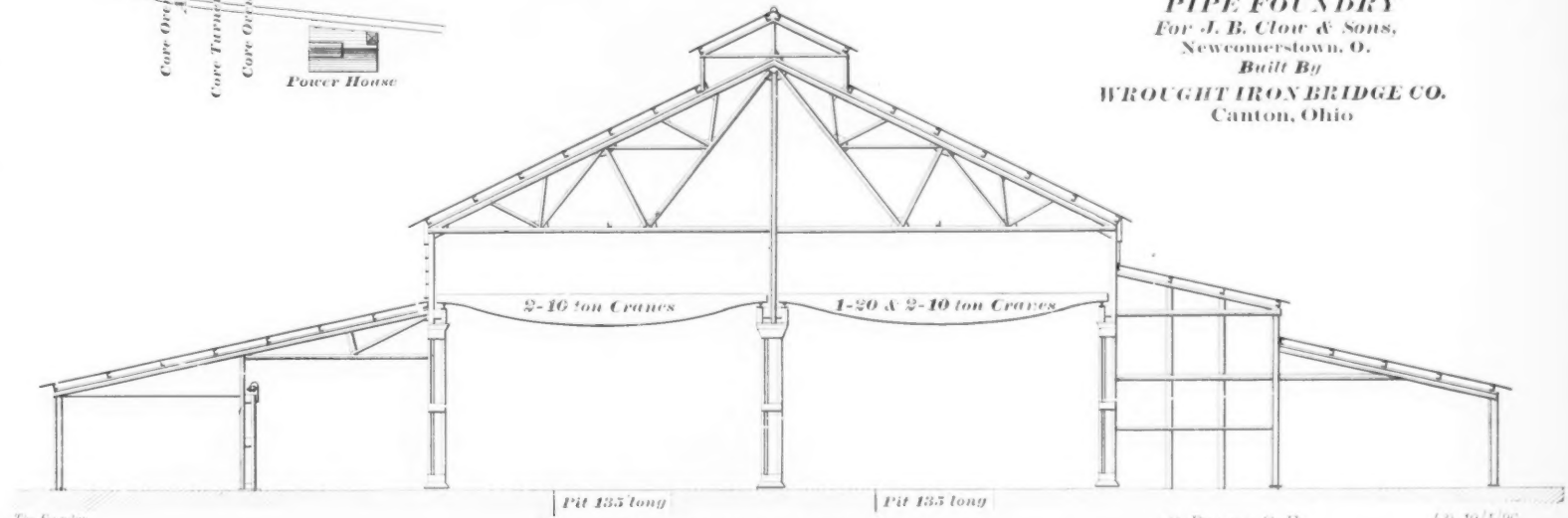

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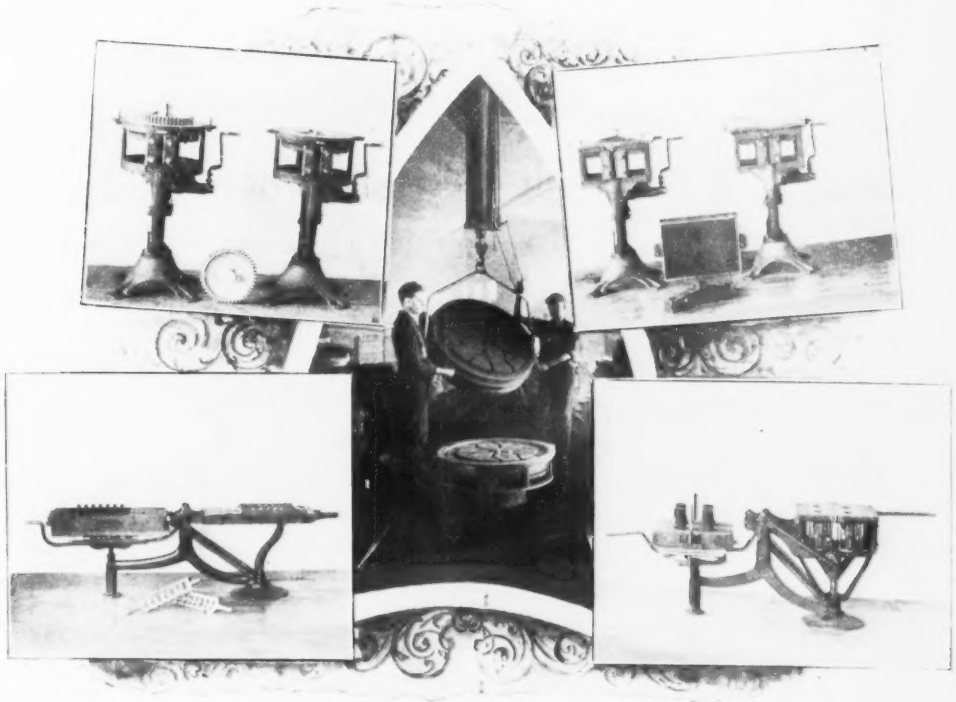

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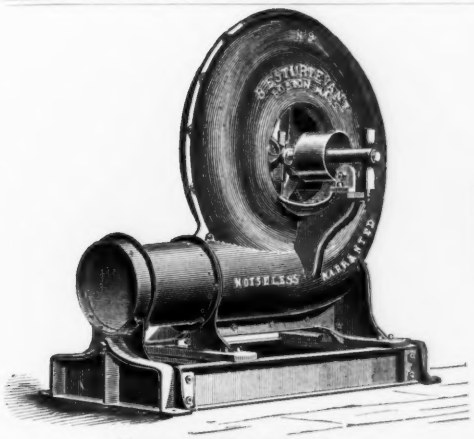
The following is a list of some of the parties for whom we have furnished Foundry Buildings for casting both in Iron and Brass:

P. & F. Corbin, New Britain, Conn.
Malleable Iron Fittings Co., Branford, Conn.
Bagley and Sewall, Watertown, N. Y.
Ansonia Brass & Copper Co., Ansonia, Conn.
Lake Erie Engineering Co., Buffalo, N. Y.
Waterbury Brass Co., Waterbury, Conn.
Brooks Locomotive Works, Dunkirk, N. Y.
Newport News Foundry Co., Hampton, Va.
The Standard Harrow Co., Utica, N. Y.
Munson Bros., Utica, N. Y.
Wm. Cramp & Sons' Ship & Engine Building Co., Philadelphia, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.
Union Metallic Cartridge Co., Bridgeport, Conn.
Randolph & Clowes, Waterbury, Conn.
Holmes, Booth & Haydens, Waterbury, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Samuel F. Hodge & Co., Detroit, Mich.
National Transit Co., Oil City, Pa.
Farrel Foundry & Machine Co., Ansonia, Conn.
Naugatuck Malleable Iron Co., Naugatuck, Conn.
Jackson & Woodin Mfg. Co., Berwick, Pa.
The Batopilas Mining Co., Chihuahua, Mexico.
Daniel E. Paris Stove Co., Sioux City, Iowa.
Watts-Campbell Co., Newark, N. J.
Pratt & Cady Co., Hartford, Conn.
New Haven Copper Co., Seymour, Conn.
Brooklyn Brass & Copper Co., Brooklyn, N. Y.
Coe Brass Co., Torrington, Conn.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.



Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

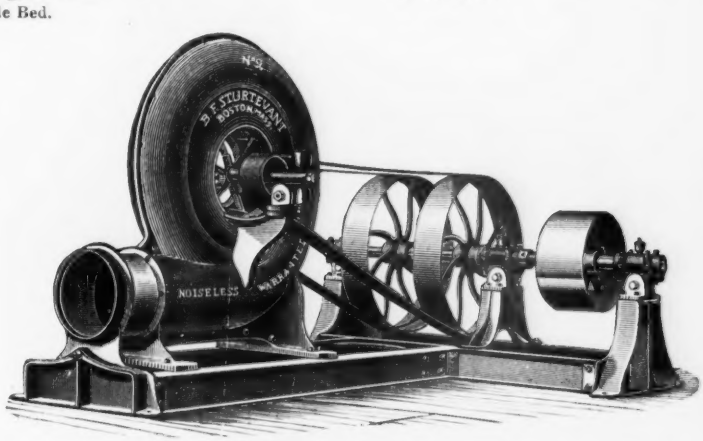
—FOR—

Cupola Furnaces and Forge Fires.

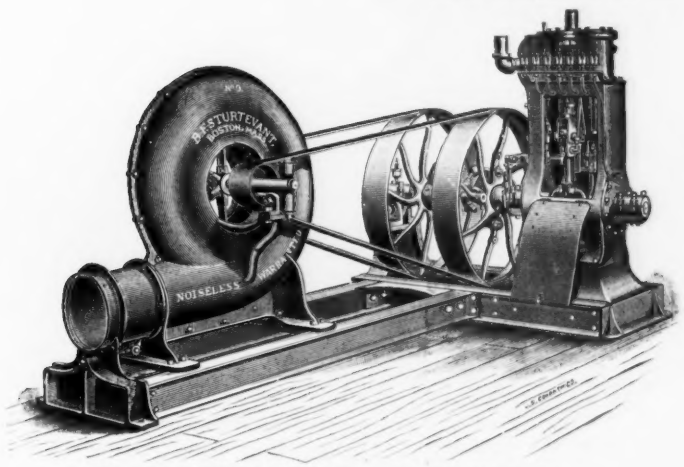
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors

Send for Catalogue.

B. F. STURTEVANT CO.,

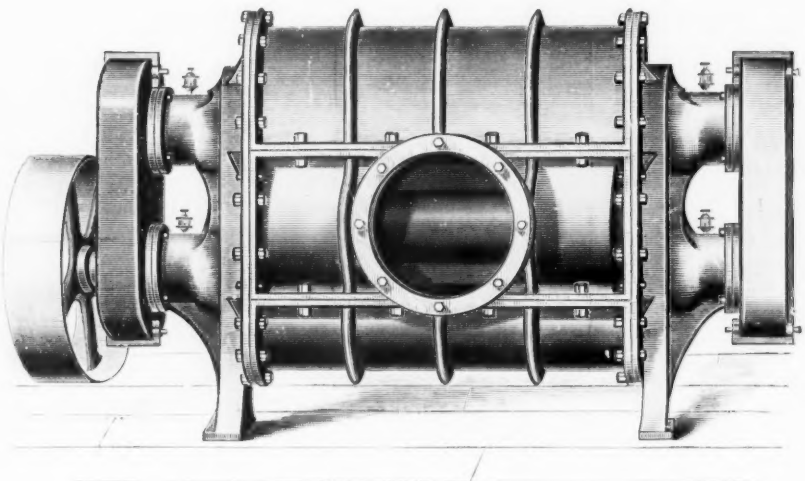
BOSTON, MASS.

131 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

STOCK CARRIED AT BRANCHES.

The Green Rotary Pressure Blower

GIVES THE MOST AIR FOR A $.



Working parts are two perfectly balanced impellers, mounted on the best steel shafts, running in bronze bushes, cut gearing at both ends of the Blower enclosed in oil-tight casing.

Weighs less, occupies less space, costs less for freight than any other POSITIVE BLOWER in existance.

GIVES THE MOST AIR FOR A $.

SEND FOR CATALOGUE.

Wilbraham Baker Blower Co.,

2518 Frankford Ave., PHILADELPHIA, PA.

P.G.COCHRAN *President*
JNO.H.WURTZ *Secretary*
J.R.LAUGHREY *Treasurer*
J.S.NEWMYER *Manager*

COAL MINES & COKE WORKS
On Pittsburgh & Lake Erie Railroad
GENERAL OFFICE
Dawson Pa.
SALES OFFICE
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WASHINGTON COAL & COKE CO.

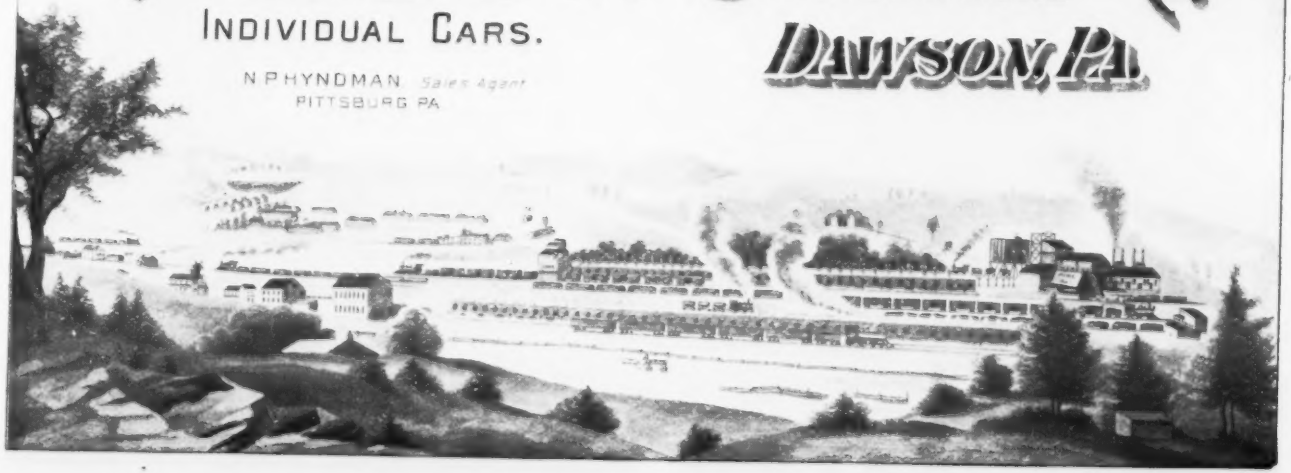
CAPITAL PAID UP $250,000.00

Youghiogheny Coal · High Grade Coke

INDIVIDUAL CARS.

DAWSON, PA.

N.P.HYNDMAN *Sales Agent*
PITTSBURG PA.

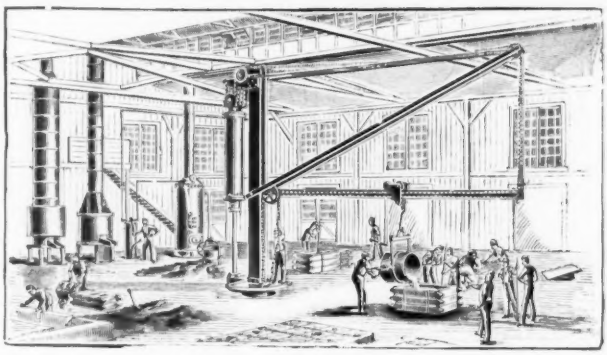


What in the world will we do?

If times take a notion to get better! It is just wonderful the number of people who say:

"Ridgway, we have made up our minds to adopt that Crane of yours just as soon as business gets better."

If business does get better, and all these people come a-running after Ridgway Cranes, what's to be done? You can't stock up with Cranes like you can with coffee mills.



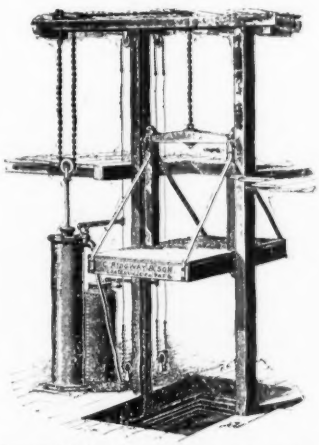
5-ton Steam-Hydraulic Crane in a Foundry.

There is, however, one thing we won't do. We won't make them for the mere fun of the thing, like we are now and have been for some years. A man don't mind being in business for glory some of the time, but you can't work for glory all the time.

These days are the "glory" days. The give-away days Just-to-keep-agoing days. A good time to buy, even if a bad time to sell.

We are here and we make Cranes, and if you have money enough to buy a Crane, now is the time to buy it.

At any rate, if you are not in the Crane-buying humor just now, it don't cost you anything to investigate a machine that makes the claims this one does. You are finding out the Cranes you have are a disappointment, even is you did pay big money for them. Look into our promise that the Ridgway Crane, which costs so little money, will enable your men to turn out 50 per cent. more work for the same wages.



Steam-Hydraulic Elevator, also made direct acting with cylinder under platform.

—

"PLEASE TAKE THE ELEVATOR."

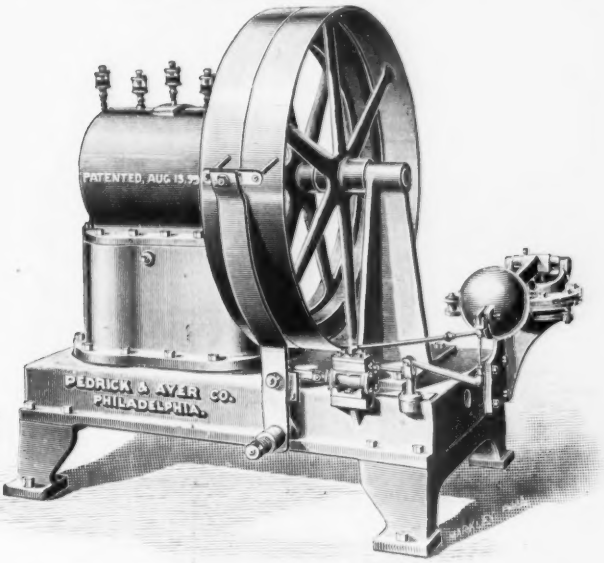
Use No Other.

—

CRAIG RIDGWAY & SON, COATESVILLE, PA.

Automatic Compound Belt Air Compressors.

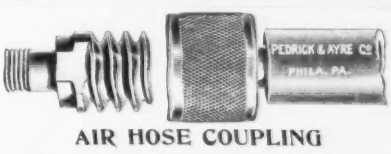
PATENTED AUGUST 13TH 1895.



Straight Lift Hoist.

Built in two sizes, Nos. 1 and 2.

No.	Size of Cylinders in inches	Revolutions per Minute.	Cubic Feet of Free Air	Horse Power Required.	Size of Pulleys in inches	Shipping Weight of Compressor	Floor Space in inches	Telegraphic Symbol
1	11x 6 6x 6	100-160	32- 50	2-3½	40x5	2875 lbs.	60x40	Parian
2	1:x10 8x10	90-120	90-120	9-15	60x6	5370 lbs.	70x60	Parish



AIR HOSE COUPLING

For ½ inch, ¾ inch and 1 inch Hose.

These Compressors will compress more air at less cost than any other make, requiring no attention other than oiling; entirely automatic in action, stopping and starting as air is required. Specially adapted for foundry use. Can be run in series, if so, no stoppage impossible.

Horizontal Air Lift for low ceilings; for general lifting, quick in action and under perfect control of operator.

Straight Air Lift for foundry purposes when equipped with retaining and releasing valve, will hold the load whether heavy or light, in the desired position, as in case of lifting a ladle of molten iron and pouring it or raising a flask to knock out the sand. It can neither ascend or decend as long as connected to air supply.

Air Hose Couplings are designed to do away with long lines of hose. By having suspended along the air line a number of hose equipped with this device, connections can instantly be made or disconnected, allowing one hoist to serve in several places. Each size made in duplicate. Containing a shut-off valve.

Send for circulars and details to Pedrick & Ayer Co., Pneumatic Department.

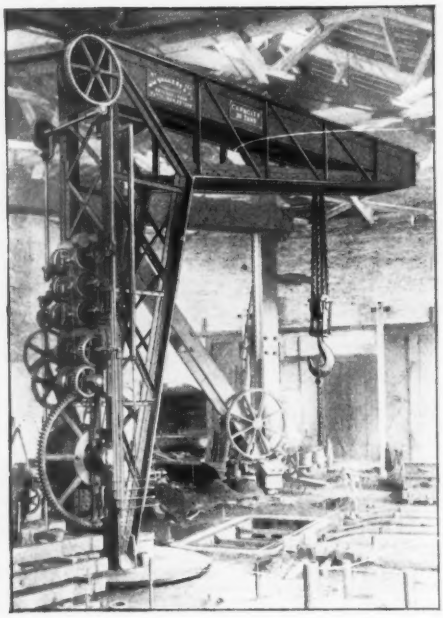
PEDRICK & AYER CO.

SPRING GARDEN STATION, PHILADELPHIA, PA.

William Sellers & Co., Incorp.

PHILADELPHIA.

MODERN FOUNDRY MACHINERY



In connection with our Machine Tool Business, we conduct a large foundry where practical tests are continually made of new labor-saving devices. The manufacture of

IMPROVED FOUNDRY CRANES

has become an important feature.

The accompanying illustration shows a quick-acting 30-ton Steam Jib-Crane, erected in the foundry of J. Morton Poole Co., Wilmington, Del., superceding old wooden cranes, one of which appears in the background.

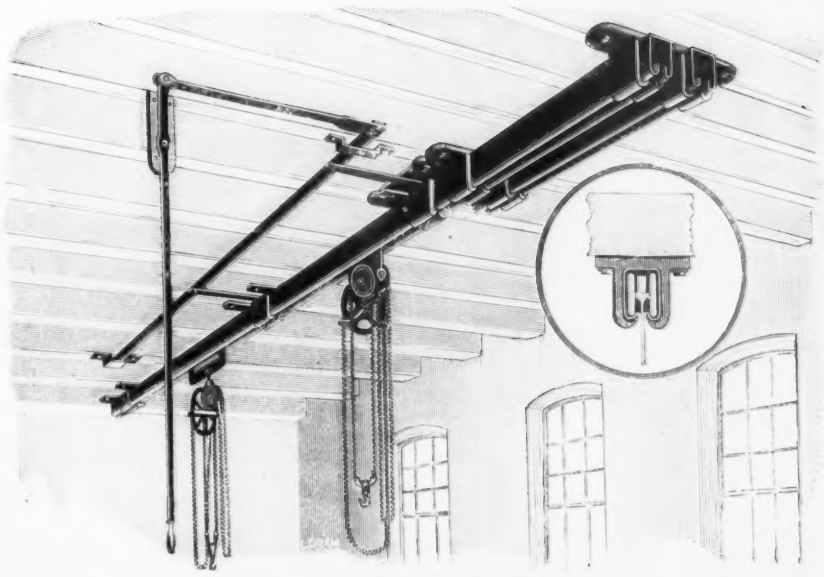
This crane is driven by independent 8" x 8" engines. The platform levers are near the floor. The effective radius of hook is 23 feet.

In future issues of this magazine, we will show illustrations of Jib and Traveling Cranes operated by electric motors.

Centrifugal Sand Mixer

Since the introduction and favorable reception of this effective, expeditious and economical **machine for preparing sand for molds and cores** we have simplified its construction and cheapened its cost. The capacity of the machine is remarkable, being limited only by the facilities for feeding sand into the hopper. Two men will easily shovel 5 tons an hour into the machine.

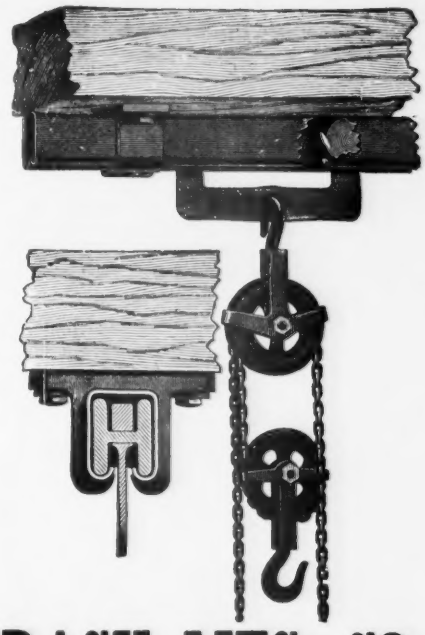
The qualities of "toughness" and "porosity" are materially improved by this process of preparing molding sand.



THE PATENT

Overhead Trolley Track System

Is the coming improvement in the iron foundries of this country and in many cases can be made to pay for itself in a few months.



Just the thing for

Carrying Iron from Cupola to Floors.
Carrying Castings from Floors to Cleaning Rooms. . . . .
Lifting, Rolling or Moving Flasks. .

All who have adopted this system have expressed themselves as being delighted with it.

Write us for Circulars, Estimates and Full Particulars.

COBURN TROLLEY TRACK MFG. CO.

HOLYOKE, MASS.

Over 10,000 in Use.

ALWAYS READY!

800 TO 2000 CANDLE POWER.

ESPECIALLY ADAPTED FOR

FOUNDRIES

PORTABLE, SELF-CONTAINED, AUTOMATIC.

NO SMOKE! NO SPRAY! NO SHARP SHADOWS!

Now in Valuable Use With Hundreds of Foundries

In addition to 400 Railroads and over 300 Contractors.

REQUEST CIRCULARS FROM

THE WELLS LIGHT M'F'G. CO.

EDWARD ROBINSON, Sole Proprietor.

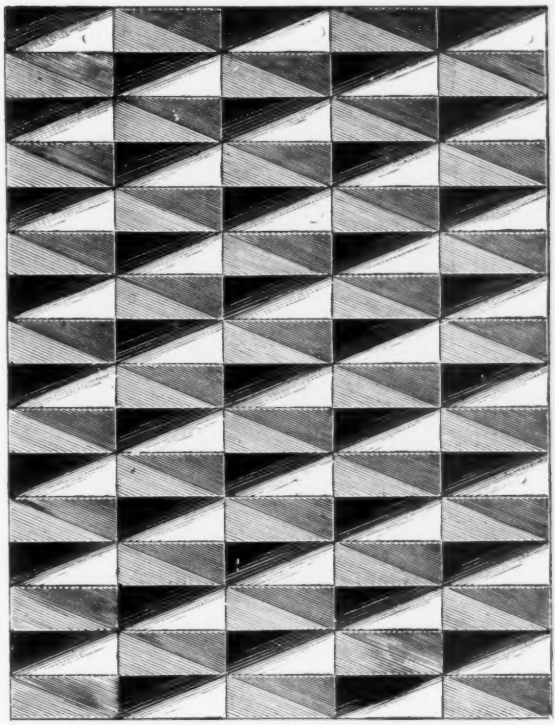
MENTION THE FOUNDRY. **44-46 WASHINGTON STREET, NEW YORK.**

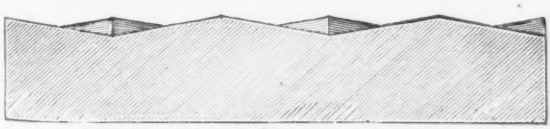
ROSS-MEEHAN FOUNDRY CO.,
CHATTANOOGA, TENN., May 5, '99.

The Wells Light M'f'g. Co., Nos. 44 and 46 Washington St., New York City:

GENTLEMEN—It is contrary to our rule to give testimonials, but an article with the merit of your Wells Light deserves to be made an exception. We have used your lights for the past five years, and consider them indispensible to us.

Yours very truly,
ROSS-MEEHAN FOUNDRY CO.
P. A. BRAWNER, JR., Sec'y. & Treas.





The above cut shows exact size of Diamonds.

Diamond Pattern Lumber,

—FOR—

DOOR SILLS, PLATFORMS, STEP PLATES, Etc.

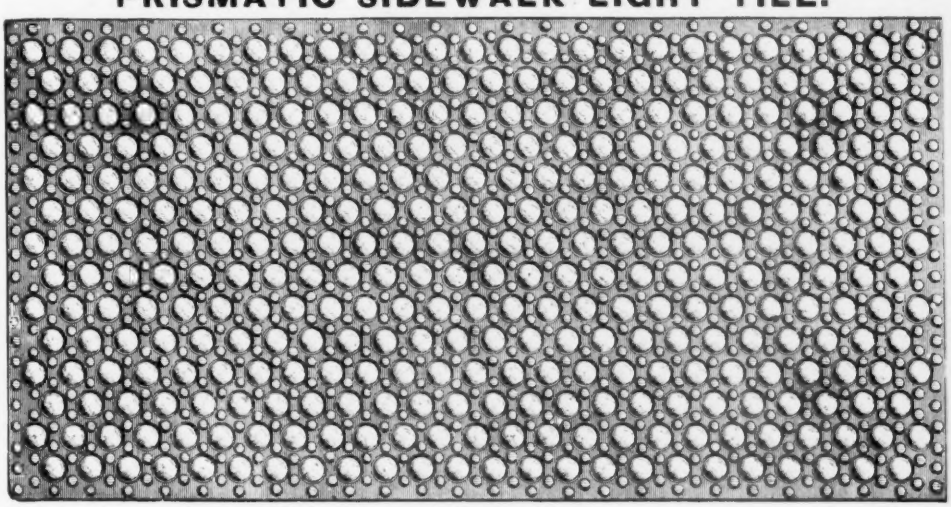
This Patent Lumber is made by a Special Machine invented by us, the ONLY Machine of its kind, and each piece will match PERFECTLY with all other pieces, by "joining" the edges to the centre, lengthwise, or any row of Diamonds.

Size of each piece, 8 feet long by 6 inches wide, and ⅞ inch thick. Price 10 cents per running foot of 6 inches in width, NET CASH crated and delivered f. o. b. Chicago, in orders of not less than 6 pieces. Send for sample.

BROWN BROS. MFG. CO.

Cor. Clinton and Jackson Sts. Chicago.

PRISMATIC SIDEWALK LIGHT TILE.



Make your own frames and we will furnish you with Tiles for either Iron or Concrete Lights. Write for prices.

BROWN BROS. MFG. CO.,

Mention THE FOUNDRY. Cor. Jackson and Clinton Sts. CHICAGO.

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

15 Beekman Street, NEW YORK

Boston Office, 85 Water Street

F. A. COODRICH & CO.

Incorporated

PIG IRON, STEEL, COKE, ETC.

Detroit, Mich.

MATTHEW ADDY & CO.

CINCINNATI, ST. LOUIS.

Agencies,

Chicago, Detroit, New York,

Philadelphia.

PICKANDS, BROWN & CO.,

Manufacturers, Importers and Dealers in

PIG IRON AND IRON ORE.

Rookery Building, CHICAGO.

THE DOMHOFF & JOYCE CO.

PIG IRON-COKE.

CINCINNATI

CLINTON IRON & STEEL CO.

Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

PITTSBURG, PA

15 Cortlandt St., NEW YORK.

ROGERS, BROWN & CO.

CINCINNATI, CHICAGO.

BUFFALO,

PHILADELPHIA, NEW YORK,

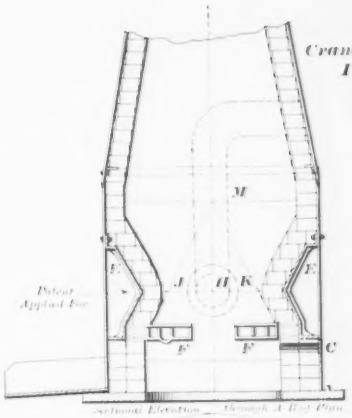
ST. LOUIS

Do not hesitate

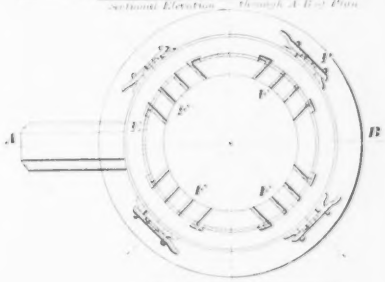
BUT REDUCE YOUR

Brick and Fuel Bills

Your neighbors are all considering it. Buy the **Crandall Cupola** before the "show catches up with the advance agent of prosperity." Prices will be increased later on sure.



Crandall Cupola, Improved



Plan through Tuyeres

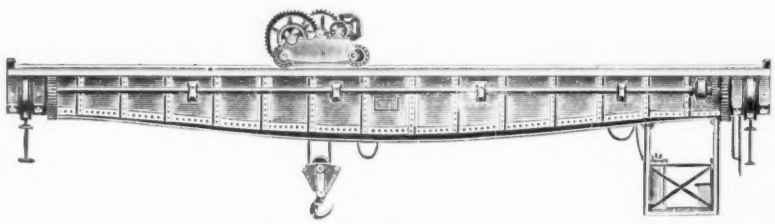
- Cupola Furnaces
- Blowers
- Cranes
- Compressors
- Hoists
- Elevators
- Foundry and Core Oven Cars
- Ladles
- Reservoirs
- Tumbling Mills
- Core Ovens
- Sand Sifters
- Brass Furnaces
- Testing Machines
- Trolley Tracks
- Foundry Lights
- Flasks
- Fire Brick
- Fire Clay
- Molding Sand

Only let us quote and explain what we have, that is all we ask

We have everything used in a Foundry.

The Foundry Outfitting Co.

DETROIT, MICH.

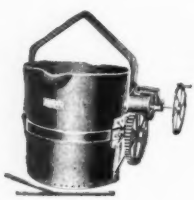


CRANES Traveling or Jib, Electric, Air, Steam, Hand. All kinds. Our Crane Catalogue shows them.

AIR HOISTS A moderate priced device of this kind (that handles your product twenty times faster than hand power can do it) pays good interest on your investment. Prices on request.

THE WHITING CUPOLA

The best melter of iron. Fourteen sizes. Read our Cupola Catalogue.



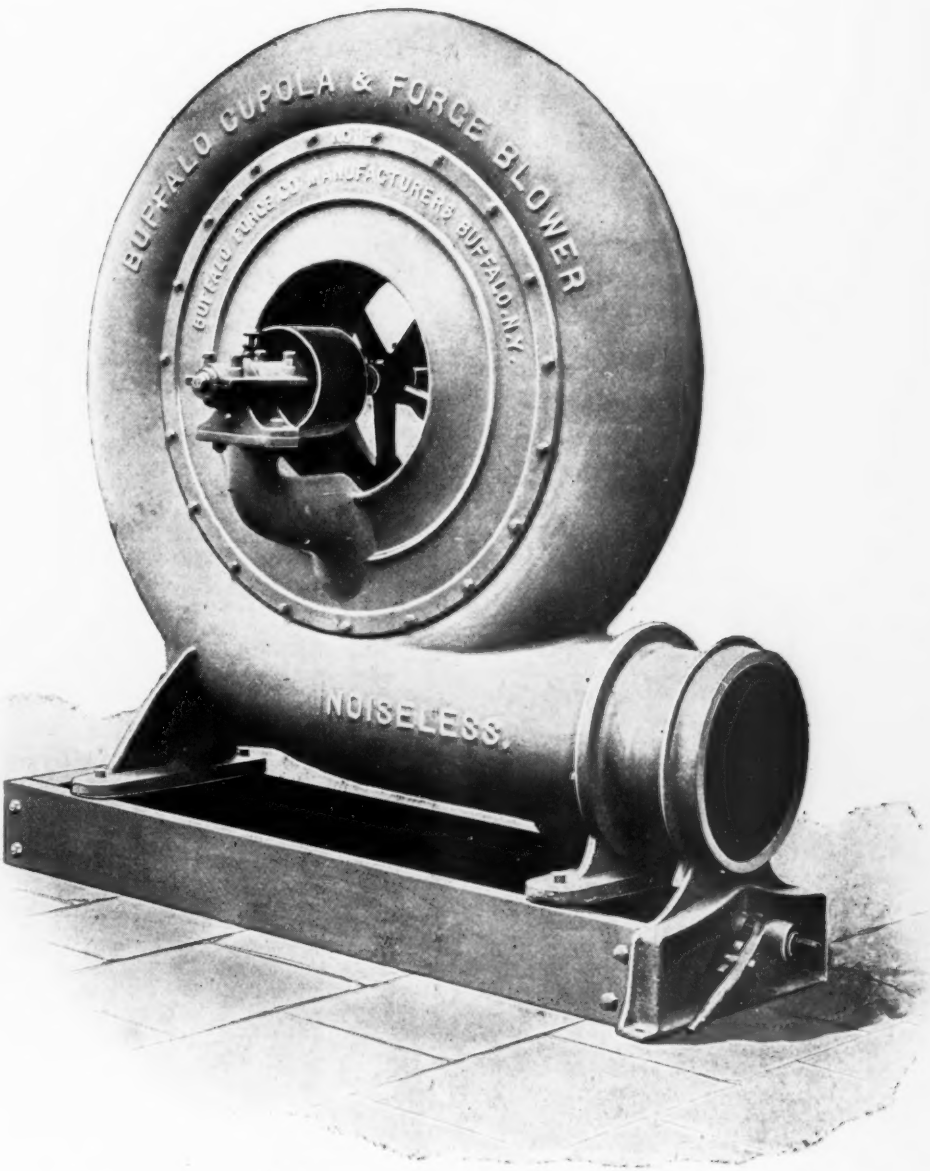
LADLES

Some new designs showing progress in the construction of these articles are illustrated in our General Catalogue.

Whiting Foundry Equipment Co

HARVEY, ILL. (Chicago Suburb.)

Catalogue and Prices on Request.

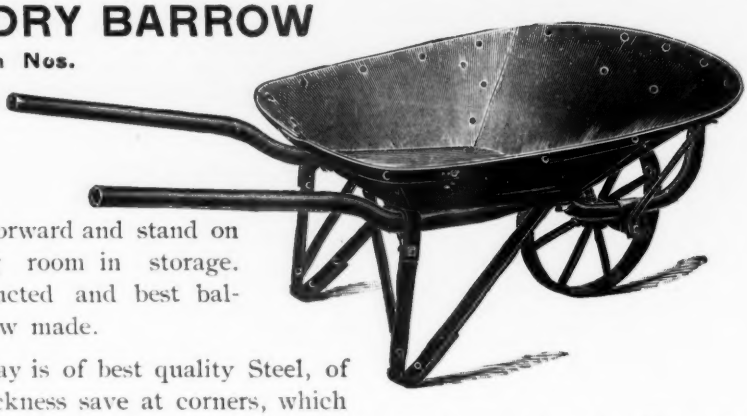


A BUFFALO BLOWER—ENOUGH SAID.

"SYRACUSE" Steel Wheelbarrows

FOUNDRY BARROW

Ten Nos.



All dump forward and stand on end, saving room in storage. Best constructed and best balanced Barrow made.

The Tray is of best quality Steel, of uniform thickness save at corners, which are of double thickness, being smoothly lapped and riveted. The edges are rolled over a band of steel riveted under the flange. The Legs have renewable Steel Shoes. Patent Steel Wheel with Staggered Spokes. Heavily braced throughout. The most durable and easily handled Barrow made. Steel Charging and other Barrows in variety. Send for handsome Illustrated Barrow and Truck Catalogue No. 6

SYRACUSE CHILLED PLOW CO., Syracuse, N. Y.

Crucibles AND Plumbago

Progress is the order of the day and our improvements have been so marked that we have attained as high as 90 heats. as per testimonial attached.

New Orleans, La., Feb. 13, 1896.

HUSSMAN CRUCIBLE CO., St. Louis, Mo.:

Dear Sirs—Kindly send me four (4) No. 70 and four (4) No. 80 Crucibles. I think I have established a record for Plumbago Crucibles. I took out an even 90 heats from one of your No. 70 Pots. Trusting you will give this order your immediate attention. I am,

Very truly yours,

F. H. KORETKE,

922 Magazine Street, New Orleans, La.

CEYLON PLUMBAGO is the best for Facings, Lubricant, etc., and our prices the lowest.

Hussman Crucible Co.

ST. LOUIS, MO.

Eberhardt's Patented Sprue or Gate Cutter

Dear Sirs:—The machine fills the bill; am just delighted with it.

Yours truly,
Maryland Brass & Metal Works,
Baltimore, Md.

Price Low

Send to

GOULD & EBERHARDT, NEWARK, N. J.

BUYERS' DIRECTORY.

ALUMINUM.
Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.

AIR HOISTS.
Ingersoll-Sergeant Drill Co., New York, N. Y.
Whiting Foundry Equipment Co., Harvey, Ill.
Pedrick & Ayer, Philadelphia, Pa.

AIR COMPRESSORS.
Pedrick & Ayer, Philadelphia, Pa.

BARREL TRUCKS.
The Adams Co., Dubuque, Ia.

BLOWERS.
Buffalo Forge Co., Buffalo, N. Y.
Connersville Blower Co., Connersville, Ind.
Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass.
Wilbraham Baker Blower Co., Philadelphia, Pa.

BRASS FOUNDERS' SUPPLIES.
Brass Founders' Supply Co., Newark, N. J.

BRONZES.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

CHARCOAL.
Springfield Facing Co., Springfield, Mass.

COKE.
Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
Vreeland Tompkins, Jersey City, N. J.
American Glutrose Works, Philadelphia, Pa.

CORE OVENS.
Millett Core Oven Co., Brightwood, Mass.

CORE OVEN CARS.
Foundry Outfitting Co., Detroit, Mich.
Whiting Foundry Equipment Co., Chicago.

CRANES.
Addyston Pipe and Steel Co., Cincinnati, O.
Craig, Ridgway & Son, Coatesville, Pa.
Wm. Sellers Co., Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

CRUCIBLES.
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Hussman Crucible Co., St. Louis, Mo.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co. Robert J., Philadelphia, Pa.

CUPOLAS.
Foundry Outfitting Co., The, Detroit, Mich.
Whiting Foundry Equipment Co., Harvey, Ill.

ELEVATORS.
Ridgway & Son, Craig, Coatesville, Pa.

FIRE-BRICK.
Brooklyn Fire Brick Works, Brooklyn, N. Y.
Obermayer Company, The S., Cincinnati, O.
Paxson, J. W., & Co., Philadelphia, Pa.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.
Whitehead Bros .Co., New York.

FLASKS.
Diamond Clamp & Flask Co., Richmond., Ind.
Brass Founders' Supply Co., Newark, N. J.

FLEXIBLE SHAFTS.
Stow Mfg. Co., Binghamton, N. Y.

FOUNDRY LADLES.
Foundry Outfitting Co., The, Detroit.
Obermayer Company, The S., Cincinnati, O.
Paxson & Co., J. W., Philadelphia, Pa.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.
Whiting Foundry Equipment Co., Harvey, Ill.

FOUNDRY PLANS.
Foundry Outfitting Co., The, Detroit, Mich.
Whiting Foundry Equipment Co., Harvey, Ill.

FOUNDRY SUPPLIES.
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Joseph Dixon Crucible Co., Jersey City, N. J.
J. S. McCormick Company, Pittsburg, P
Obermayer Company, The S., Cincinnati, O.
Paxson & Co., J. W., Philadelphia, Pa.
Smith Foundry Supply Co., Cincinnati, Ohio.
Springfield Facing Co., Springfield, Mass.
Whitehead Bros. Co., New York.

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Stow Mfg. Co., Binghampton, N. Y.

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Vreeland Tompkins, Jersey City, N. J.

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Whitehead Bros. Co., New York.

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If you don't you are not keeping up with the times.

AIR IN THE SHOP SAVES MONEY.

THE

Ingersoll-Sergeant Drill Co.

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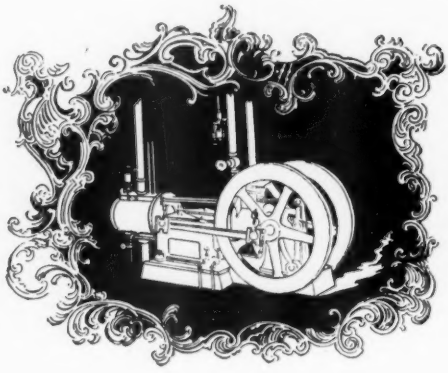

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ARE THE HIGHEST TYPE OF MACHINES.

ARE YOU TROUBLED

With Blow Holes in Iron Castings?

Do you have Small Imperfections in Iron Castings?

"SMOOTH ON" IRON T COMPOUND CASTINGS

IF SO.

Tompkins' "Smooth on" Castings Iron Compound

IS WHAT YOU WANT.

VREELAND TOMPKINS, Manufacturing and Analytical Chemist . . .

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(Formerly R. M. BARNETT Co.)

Makers of

FLASKS
FURNACES
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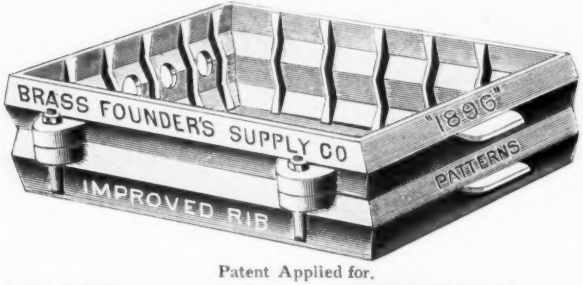
Supplies and Specialties.



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The Improved RIB, BEVELED, and Special Designs.

ORDER THE RIBBED IT IS BEST!

Stronger and Cheaper than any others.

R. M. BARNETT, J. S. MUNDY.

30-34 PROSPECT STREET, NEWARK, N. J.

Write for Catalogue.

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.75 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month, $20.00
Half page - - -	" 12.00
Quarter page - -	" 7.00

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements must be in by the 1st of the month to insure publication.

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WE MAKE CRANES

. . . . ASK FOR OUR PRICES ON CRANES

With our special tools we make **Flange Pipe** at low cost. Let us name you prices when you require . . . .

HUB OR FLANGE PIPE AND FITTINGS.

We may be able to supply them to you at less than your cost. . . . . .

The Addyston Pipe and Steel Co.

CINCINNATI, OHIO.

Look at the Wood We Burn into . . **CHARCOAL**

NO WONDER OUR

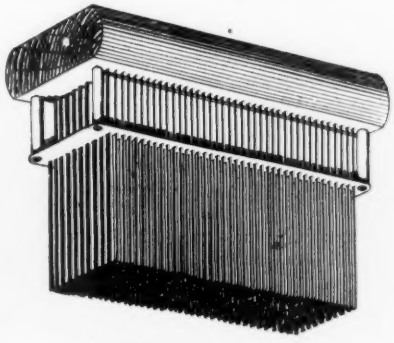
CHARCOAL FACING

is used in so many Brass and Stove Foundries.

LET US TALK IT OVER WITH YOU.

Springfield Facing Co. SPRINGFIELD MASS.

Well, it doesn't look like anything you ever saw before



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SPECIAL FEATURES. Backs all in one piece: the wires uniformly distributed; each wire separately held and protected from excessive strain by a perforated tin plate; maximum stiffness with maximum elasticity; back with rounded sides; lightness combined with strength; elegance with usefulness; best material with finest workmanship; great durability at a moderate cost.

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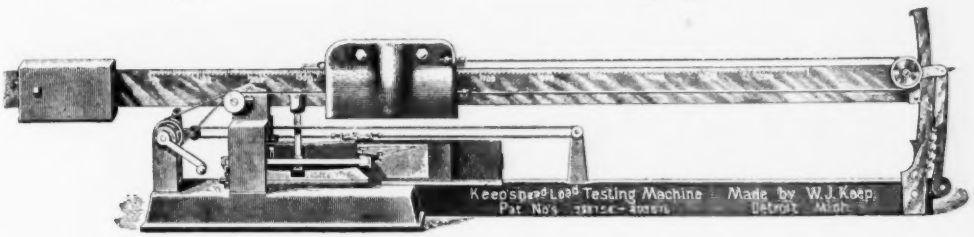
"Keep's Test" Apparatus.



HERE IS WHAT ONE LARGE CONCERN SAYS:-IT HAS PAID THEM, WHY NOT YOU?

DETROIT, MICH., March 31st, 1896.

Mr. W. J. Keep, City:

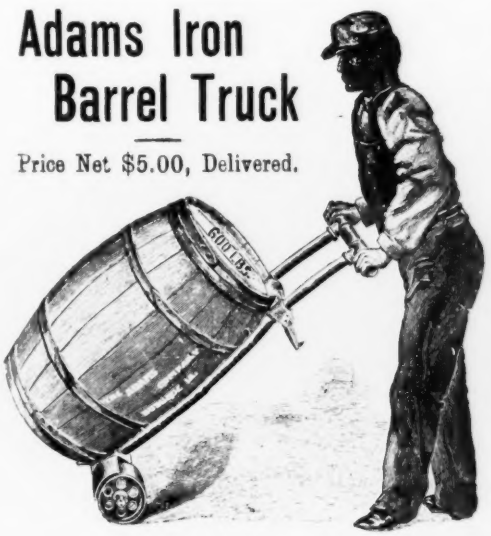
DEAR SIR: We have regulated our foundry mixture by "Keep's Test" during the past year, and can recommend it in highest terms. We know exactly what we are doing and can keep our castings of uniform quality. We find that .160 inches per foot the best shrinkage, and have been able to keep the average strength of a test bar ½ inch square and 12 inches long at 450 pounds.

Very truly yours,
LELAND & FAULCONER MFG. CO.,
H. M. LELAND, Vice-President.

To SAVE MONEY IN YOUR OWN FOUNDRY, ADDRESS **W. J. KEEP, Detroit, Mich.**

Adams Iron Barrel Truck

Price Net $5.00, Delivered.



One man can attach and move **heavily** loaded barrels, with or without heads, not touching the barrels with his hands.

More description furnished on application.

Manufactured by

THE ADAMS COMPANY. DUBUQUE, . . . IOWA.

ESTABLISHED 1854.

Brooklyn Fire Brick Works

CUPOLA BLOCKS, FIRE SAND, FIRE CLAY, FIRE MORTAR, KAOLIN

AND ALL FIRE MATERIAL REQUIRED FOR FOUNDRY PURPOSES.

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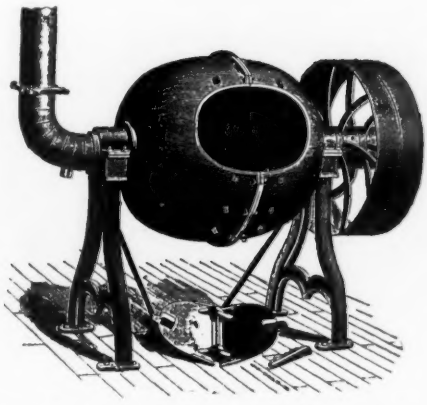
EXHAUST TUMBLING BARREL



The Stover Egg Shaped Barrel does double the work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron wire nails, or any other small articles that require cleaning and polishing.

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WE MOURN FOR THOSE WHO DO NOT KNOW
THE GOBEILLE PATTERN CO. CLEVELAND, O.

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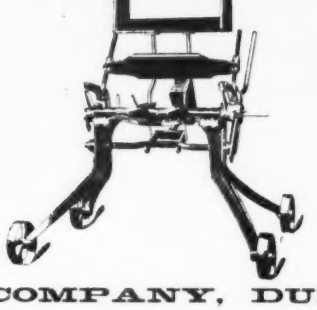

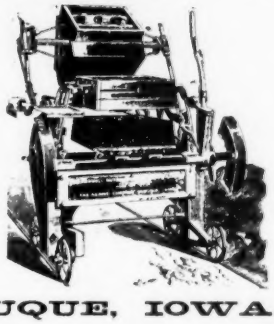

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PRICE $3

Metallurgy of Cast Iron

. . . BY . . .

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BY

A PRACTICAL MAN

It is written so that you can understand it

106 Illustrations.

573 PAGES of condensed experience, treating of fuel and iron. How these are made and how they should be handled. Have you any troubles in your foundry? Is it not likely that this book may give you relief and effect a cure. You can obtain it from . . . .

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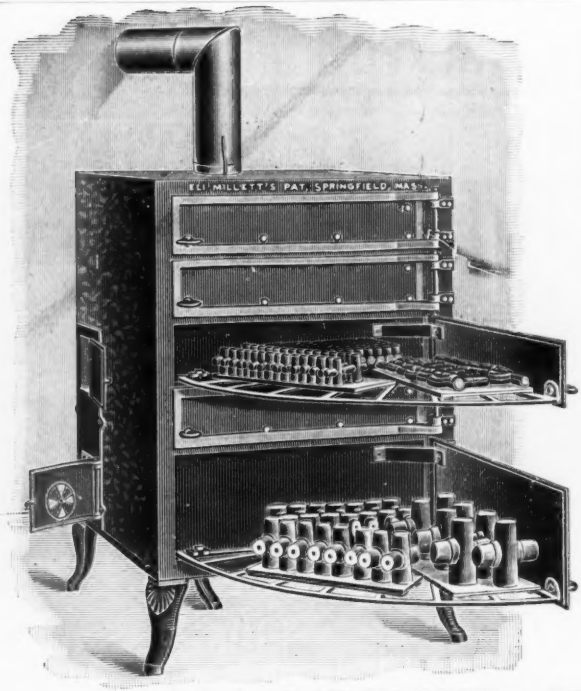

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THE BEST IN THE WORLD.

No Foundry using small Cores can afford to be without it.

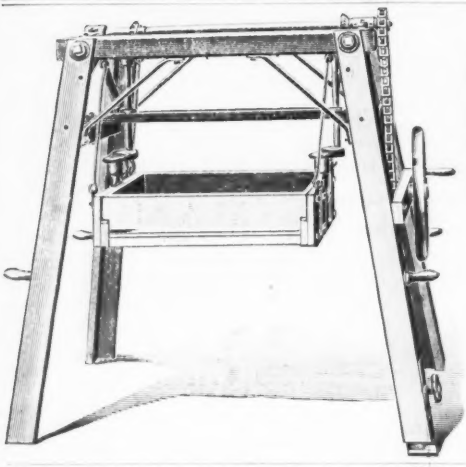
Over one hundred and fifty in use.

Send for our new Catalogue giving names of those using them.

Millett Core Oven Co.

BRIGHTWOOD. MASS.

For Sale by J. W. PAXSON & CO., Philadelphia, Pa.



THE PERFECT

Sand Riddling Machine

This is the Best, Simplest, Cheapest, Most Durable and Most Easily Operated Sand Riddling Machine made.

For full particulars and references, address,

THE SPRINGFIELD FOUNDRY CO.

SPRINGFIELD, OHIO.

If your Foreman should die,

or get a better job,

Could you fill his boots?

If not, why not? How did he get to be foreman? He worked his way up, he paid attention, he read a good deal, too. Of course, there are some foremen who don't read their trade paper, but then, they are not going to be foremen very long. Too many good men growing up to allow an ignoramus at the head of a foundry. Have you got any ambition to take charge of a shop? **The Foundry** will help you to get such a position and to hold it after you do get it. It contains everything about Foundryology and is the greatest pull you can have.

IMPROVED PATENT.. **Sand Blast Machinery**

TILGHMAN'S PATENTS. MATHEWSON'S PATENTS.

For Removing the Scale from Iron and Steel Plates.

Cleaning Castings, Forgings, etc.

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There Are Others!

But none like this one.

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TRANSPARENT AND UNBREAKABLE.

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We will give them to you!

FOR $2.50 EACH.

You are sure to get your money back.

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FREE BRUSHES!

We will send one or more of our **Patent Casting Brushes** FREE to any reliable foundry requesting them to test the truth of our claim, which is that in our **Patent Bridled Casting Brushes** the wires do not break as they do in any other brush.

This can readily be proved by taking off the Bridle Band from one end of a brush. It will then be shown that the wires will remain in place where protected with the remaining bridle long after the wires are all gone from the other end of the brush.

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"FAIR DEALING" Their Motto.

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"CLNITON" AND "HECTOR"

INSPECTED FOUNDRY IRONS . . .

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Sole Factors for DUNBAR STRONG IRON

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Why deal with Commission people or Agents who give fancy names to Irons and know nothing about their manufacture.

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(Trade Mark.)

The Universal Liquid Core Compound

Patented in the United States, England, France and Belgium.

GLUTROSE was invented and is manufactured by a practical foundryman of many years' experience, It has been used in the Pennsylvania Railroad Foundry at Altoona and other large foundries for the past three years with the most satisfactory results.

It is cheaper and better than flour, rosin, oil or any other compound in use; takes the place of all other materials and never varies in quality.

Makes the most difficult cores for iron or brass of any size.

The cores come out easily and leave the castings smooth.

Will let the air and gases off from a core which is difficult to vent better than any other material in use and makes no offensive smell or smoke.

WILL NEVER BLOW THE CASTINGS.

AMERICAN GLUTROSE WORKS

Sole Manufacturers.

OFFICE: PENN MUTUAL BUILDING,

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FACINGS
RIDDLES
SHOVELS
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We are Headquarters for Sea Coal, Plumbago, Soapstone Facings, Blackings and Supplies.

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F. F. PURE PLUMBAGO FACING.

Send for Testimonials of it.

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FOUNDRY MOLDING MACHINES,
STRIPPING PLATE MACHINES,
PORTABLE, AIR-POWER, MACHINES,

USING WOOD OR METAL SPLIT PATTERNS, WITHOUT STRIPPING PLATES.

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ESTABLISHED 1875

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INVENTORS OF THE

FLEXIBLE SHAFT

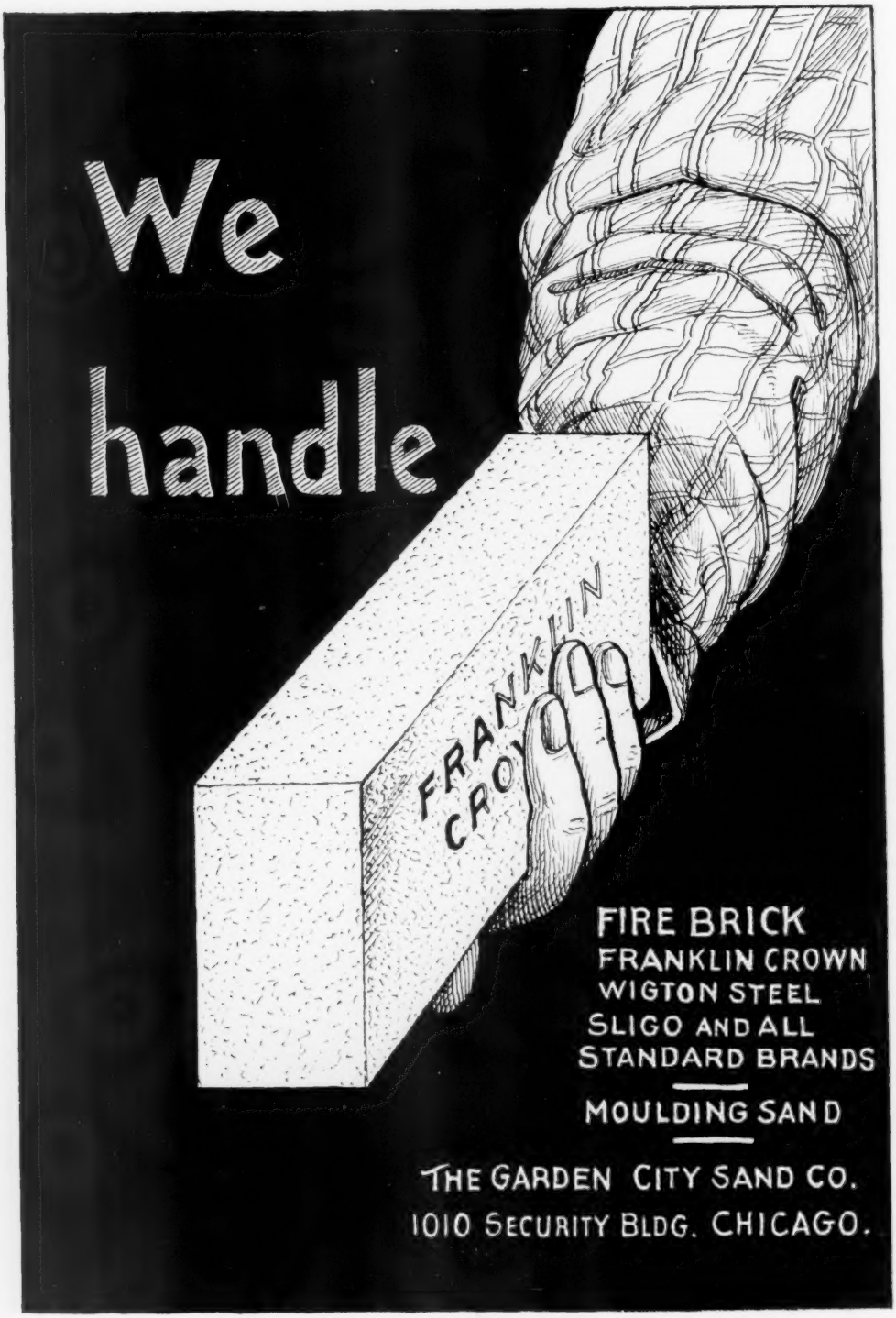
FOR ALL PURPOSES.

The oldest and largest manufacturers in the world

PORTABLE EMERY GRINDER

Take the tool to the work and save heavy handling.

WRITE US FOR CATALOGUE AND PRICES.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STANDARD BRANDS
MOULDING SAND
THE GARDEN CITY SAND CO.
1010 SECURITY BLDG. CHICAGO.

We will go more than Half way

In helping you to retain your old customers and secure new ones . . . . . .

FOUNDRY SUPPLIES AND EQUIPMENT

Are the foundation for a good trade. We manufacture only the best. Use it and the battle is half won.

Among the many things we have that are essential to you in doing business, we mention

CEYLON PLUMBAGO INDIA SILVER LEAD
FOUNDERS' PERFECT WASH
WHEELBARROWS
CRUCIBLES SEA COAL CORE COMPOUND
FLUOR SPAR BRASS SAND

All Goods Guaranteed. Samples Free.

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FACTORIES AT

CINCINNATI, O., CHICAGO, ILL., LARIMER, PA., WHITE HAVEN, PA.

ESTABLISHED 1855.

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HOW really few people there are after all who appreciate the extent of the foundry business in this country or the multiplicity of interests involved therein. Take for instance the subject of Foundry Supplies and Equipments, of which we are the acknownedged largest dealers on the face of the earth. In order to fill the requirements of our trade, we operate steadily all the year around (night and day most of the time) the following mills on different work as follows:

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Lehigh Mills, Lehighton. Pa.—Pipe Blacking, Car Wheel Mineral Facing, Mineral Facing, Core Wash Facing.

Sea Coal Mills, Irwin, Westmoreland Co., Pa.—Sea Coal Facing, Bituminous Facing, Carbon Facing, Coke Facing, Charcoal Facing.

Annex Mills, Phila., Pa.—Anthracite Facing, Lehigh Facing, Charcoal Facing, Talc Facing, Soapstone Facing, Core Compound.

Welsh Mountain Mills and Quarry, Honey Brook, Pa.—Ground Silica Rock, Ground Ganister, Silica Clay, Kaolin, Steel Mold Wash, Furnace Bottom Sand.

In the matter of Foundry Equipments we Fill Orders Promptly for such things as

Cupolas, Cupola Lining, Blowers, Ladles, Core Ovens, Iron Flasks, Snap Flasks, Rumblers, Brass, Furnaces, etc.

Our line of Sands is the Largest and Most Complete to be found and consists of any grade of

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In addition to all these, our large Foundry Supply Factory is kept running full handed making

Riddles, Sand Sifters, Casting Brushes, Bristle Brushes, Metallic Letters, Molders' Tools, Bellows, Wire Brooms, Flue Brushes, etc.

As we make all we sell, we guarantee every article.

J. W. PAXSON CO.,

PHILADELPHIA, PA.

A Word

as to

Joseph Dixon Invented the Plumbago Crucible

DATE OF INVENTION
1826.

Dixon's Crucibles have been in the Market SEVENTY YEARS.

Dixon's Plumbago Crucibles

Dixon's Crucibles are Standard all over the **GLOBE.**
Dixon's Crucibles are used in every country on the Globe where metals are melted.
Dixon's Crucibles have the highest records for **HEATS.**
Dixon's Crucibles are made to get

BEST RESULTS WITH THE LEAST COAL.

Dixon's Crucibles are made of many mixtures to suit all kinds of work.
Dixon's Crucibles are made special for Steel Melting.
Dixon's Crucibles are made special for Nickel Melting.
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Dixon's Crucibles are made special for Composition Melting.
Dixon's Crucibles are made special for Phosphor Bronze Melting.
Dixon's Crucibles are made special for German Silver Melting.
Dixon's Crucibles are made special for the Melting of Precious Metals.

In ordering you will be benefitted by mentioning the kind of Metals melted. Write for pamphlet **"How to Use Plumbago Crucibles."** The best are the cheapest, as they must stand the punishment of high heat and much wear and tear. The "Dixon" records in average efficiency, in general good behaviour and in volume of sales, far in the lead.

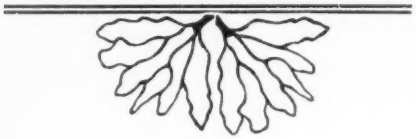
Jos. Dixon Crucible Company,

JERSEY CITY, N. J.

Whitehead Brothers Company,

DEALERS IN

Molding Sand



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PHILADELPHIA SAND
FRENCH SAND,
FIRE CLAY, KAOLIN,
FOUNDRY FACINGS
and SUPPLIES
OF ALL KINDS.
LEAD FACINGS
A SPECIALTY.

Albany Sand for Brass and Stove Plate Castings.

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70 and 72 Columbia St.

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WAREHAM, MASS.
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WATERFORD, N. Y.
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ATHENS, N. Y.
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CRUCIBLES for All Purposes . .

CRUCIBLES of All Sizes . . .

STOPPERS, Twenty-one Styles .

LIDS, COVERS, CAPS, . . .

PHOSPHORIZERS . . . .

PLUMBAGO FINE DUST . . .

ALL ARTICLES CONTAINING PLUMBAGO

Crucible.

ROBT. J. TAYLOR & SON

Crucible

Dipper.

Cover.

Stopper.

Crucibles

For melting Steel, Brass, Copper, Gold, Silver, Nickel and Metals and Alloys of Every Description; Small Crucibles for making Assays and fine pure Plumbago for lubricating, etc.

We are practical workmen and have studied the requirements of the different metal works in this country, as well as in Europe. We also work strictly by chemical analysis, giving a uniformity at all times never before approached in this or any other country.

We make All Sizes, from 8 oz. to 2 ton Capacity.

ROBT. J. TAYLOR & SON,

1900 to 1916
CALLOW HILL STREET, PHILADELPHIA, PA.

We Guarantee..

That one man with one of our **PNEUMATIC HAMMERS** can do more and better work than four men working in the ordinary way.

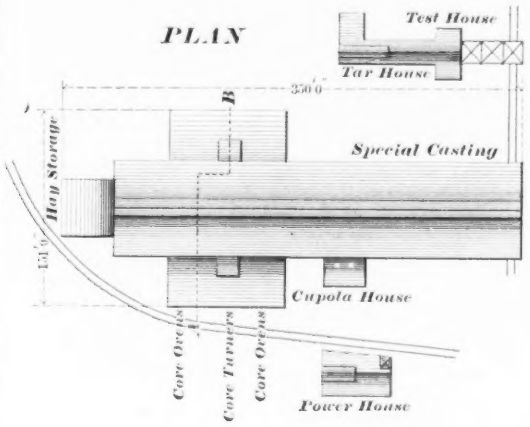
These same Hammers are also especially adapted for calking boilers and beading flues.

We also manufacture the best Air Drill on the market, and our Air Hoist and Compressors are especially designed for foundry work.

All tools sent on ten days' trial, subject to approval and are guaranteed for one year.

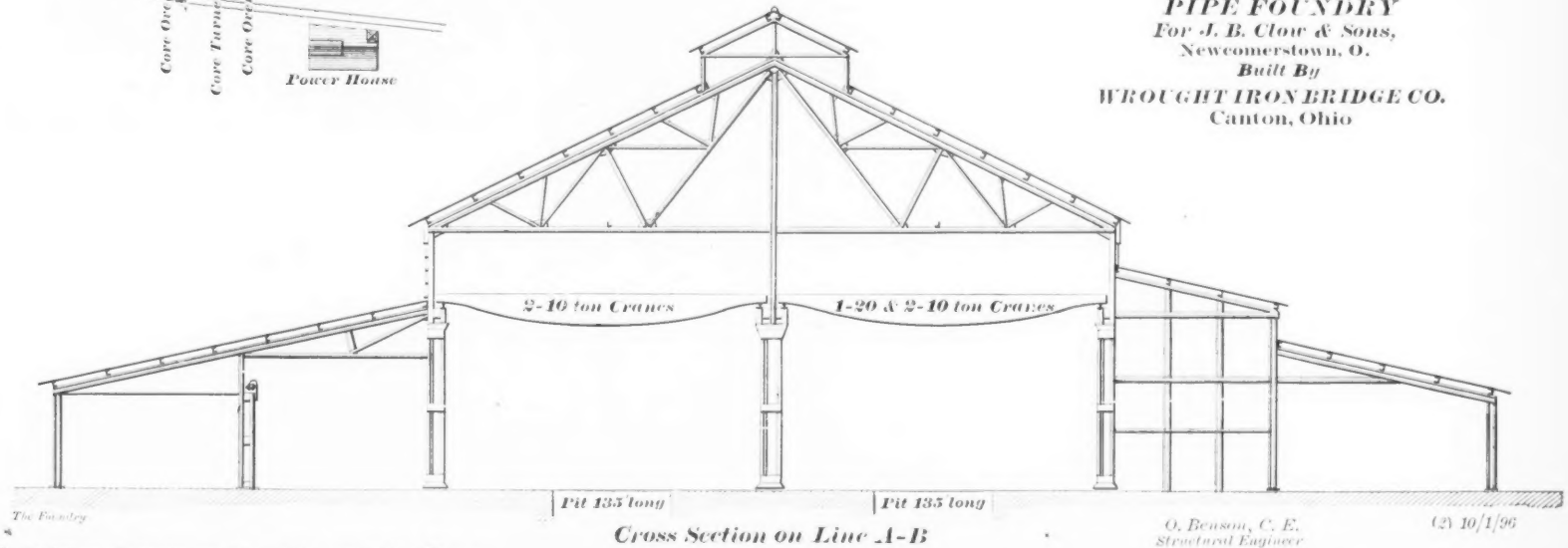
Chicago Pneumatic Tool Co.,

635 Monadnock Building, CHICAGO, ILL.



WROUGHT IRON BRIDGE CO.

PIPE FOUNDRY
For J. B. Clow & Sons,
Newcomerstown, O.
Built By
WROUGHT IRON BRIDGE CO.
Canton, Ohio



Cross Section on Line A-B

O. Benson, C. E.
Structural Engineer

(2) 10/1/96

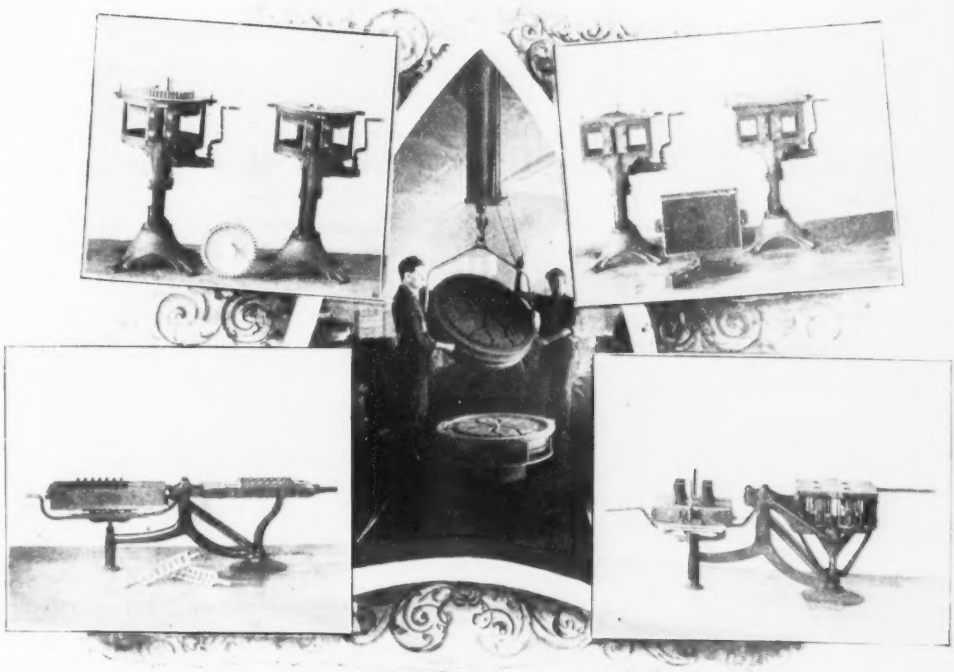
We design and construct Foundries, Machine Shops and similar structures. Also Roofs, Turntables and Bridges of every description.

Principal Office and Works at Canton, O.
Branch Offices at New York, Chicago, Indianapolis and Kansas City.

MOLDING MACHINES

FOR ALL CLASSES OF WORK.

STRAIGHT DRAW, ROCKOVER. AUTOMATIC DRAW ROCKOVER,
IN OVER TWENTY DIFFERENT SIZES.



Guaranteed to pay out in Six Months When run to their full capacity.

The Pridmore Molding Machines

INSURE BETTER AND MORE UNIFORM CASTINGS.
LESSEN COST OF MACHINE WORK ON CASTINGS.
LIGHTEN THE LABOR AND SIMPLIFY FOUNDRY METHODS.
SAVE FIFTY TO SEVENTY-FIVE PER CENT.

Those having Grey Iron or Brass Castings to make in reasonable quantities, will do well to write for full information and lists of many foundries now using these machines. Estimates, prices, terms, etc., will be promptly furnished. Rights to use these machines for Malleable Iron and Steel Castings are reserved. Address,

HENRY E. PRIDMORE,

111=113 W. Harrison St., CHICAGO, ILL., U. S. A.

CHAS. M. JARVIS, President. BURR K. FIELD, Vice-President
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

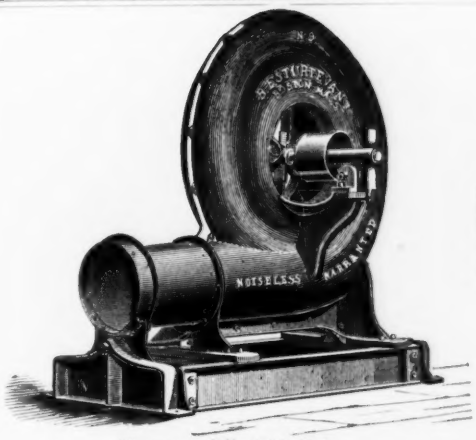
Iron and Steel Bridges, Roofs and Buildings.

The following is a list of some of the parties for whom we have furnished Foundry Buildings for casting both in Iron and Brass:

P. & F. Corbin, New Britain, Conn.
Malleable Iron Fittings Co., Branford, Conn.
Bagley and Sewall, Watertown, N. Y.
Ansonia Brass & Copper Co., Ansonia, Conn.
Lake Erie Engineering Co., Buffalo, N. Y.
Waterbury Brass Co., Waterbury, Conn.
Brooks Locomotive Works, Dunkirk, N. Y.
Newport News Foundry Co., Hampton, Va.
The Standard Harrow Co., Utica, N. Y.
Munson Bros., Utica, N. Y.
Wm. Cramp & Sons' Ship & Engine Building Co., Philadelphia, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.
Union Metallic Cartridge Co., Bridgeport, Conn.
Randolph & Clowes, Waterbury, Conn.
Holmes, Booth & Haydens, Waterbury, Conn.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Samuel F. Hodge & Co., Detroit, Mich.
National Transit Co., Oil City, Pa.
Farrel Foundry & Machine Co., Ansonia, Conn.
Naugatuck Malleable Iron Co., Naugatuck, Conn.
Jackson & Woodin Mfg. Co., Berwick, Pa.
The Batopilas Mining Co., Chihuahua, Mexico.
Daniel E. Paris Stove Co., Sioux City, Iowa.
Watts-Campbell Co., Newark, N. J.
Pratt & Cady Co., Hartford, Conn.
New Haven Copper Co., Seymour, Conn.
Brooklyn Brass & Copper Co., Brooklyn, N. Y.
Coe Brass Co., Torrington, Conn.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.



Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

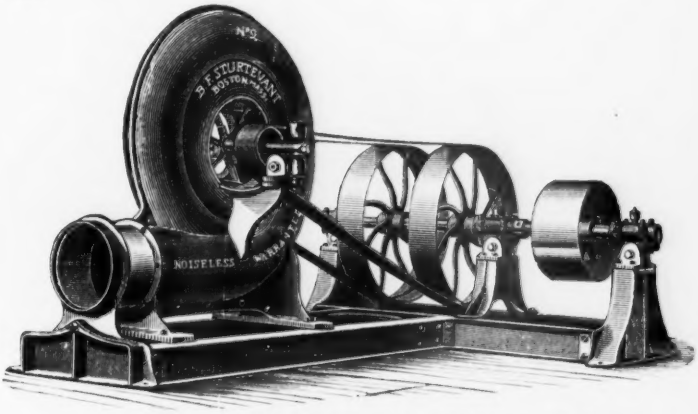
—FOR—

Cupola Furnaces and Forge Fires.

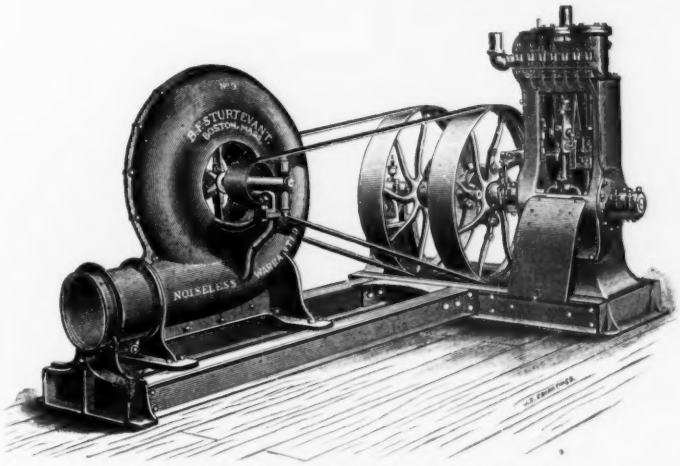
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors

Send for Catalogue.

B. F. STURTEVANT CO.,

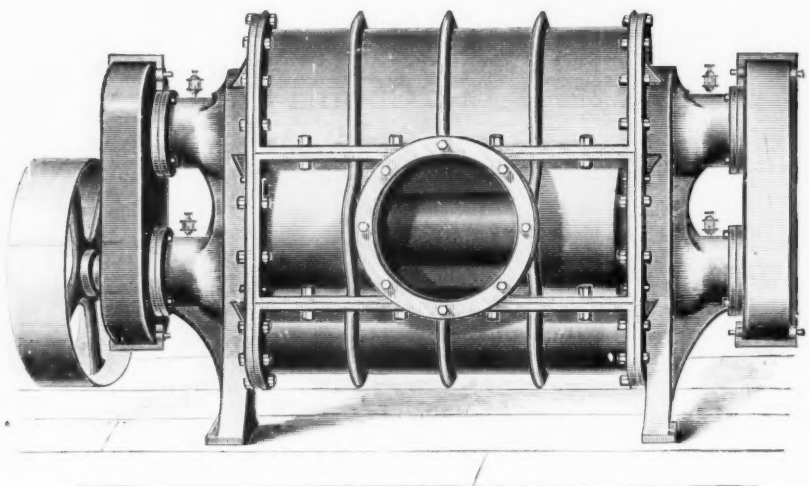
BOSTON, MASS.

131 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

STOCK CARRIED AT BRANCHES.

The Green Rotary Pressure Blower

GIVES THE MOST AIR FOR A $.



Working parts are two perfectly balanced impellers, mounted on the best steel shafts, running in bronze bushes, cut gearing at both ends of the Blower enclosed in oil-tight casing.

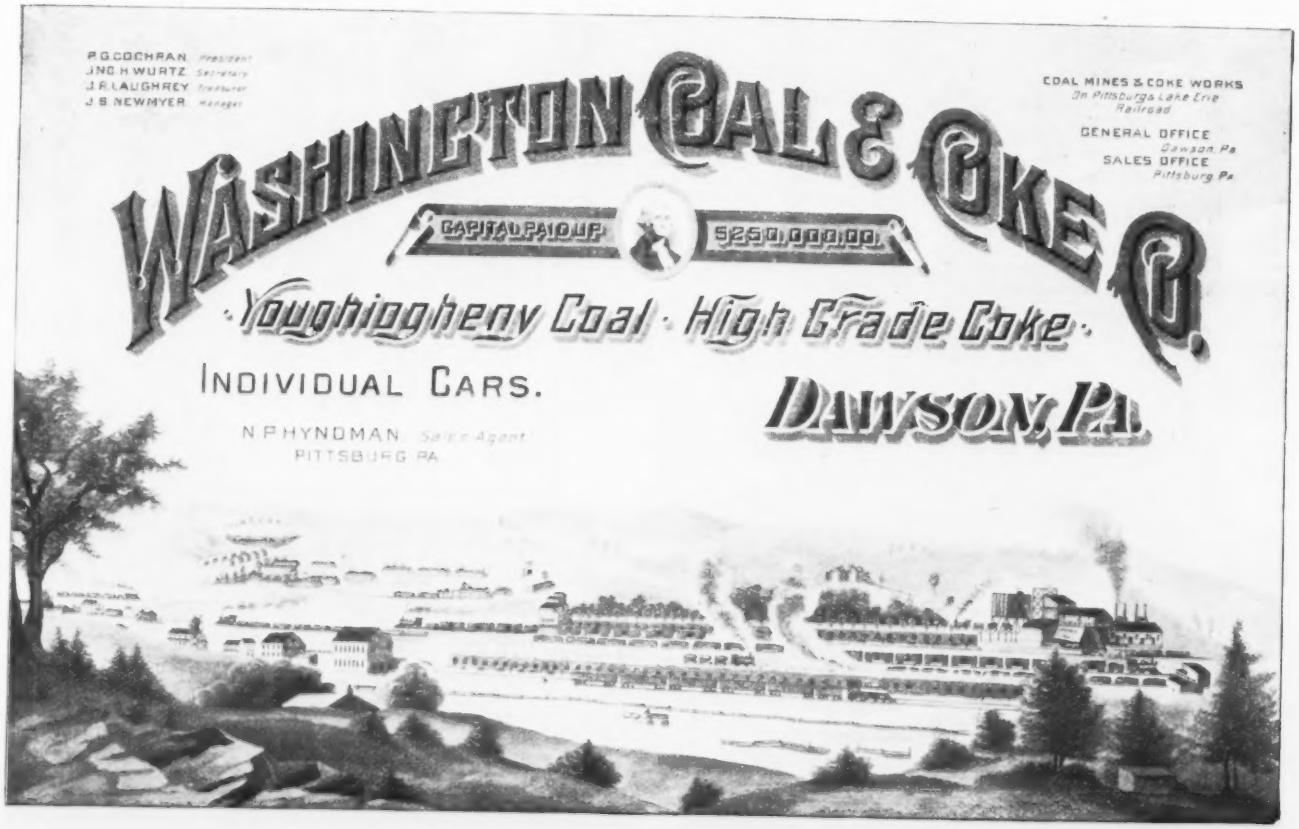
Weighs less, occupies less space, costs less for freight than any other POSITIVE BLOWER in existance.

GIVES THE MOST AIR FOR A $.

SEND FOR CATALOGUE.

Wilbraham Baker Blower Co.,

2518 Frankford Ave., PHILADELPHIA, PA.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JNO. H.WURTZ Secretary
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COAL MINES & COKE WORKS
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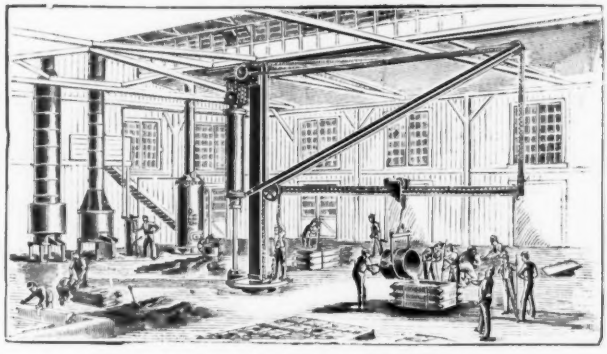
CAPITAL PAID UP
$250,000.00
Youghiogheny Coal · High Grade Coke ·
INDIVIDUAL CARS.
DAWSON, PA.
N.P.HYNDMAN Sales Agent
PITTSBURG PA.

Yes, Brother, Advertisin' Pays.

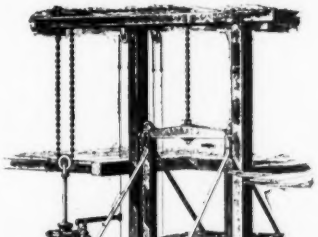
If you stick right at it. But it takes just lots of Faith to run a whole page like this in an expensive paper such as *The Foundry* and pay down your money every quarter all through the dull times. Few people are after new machinery in hard times. Especially Cranes. When business is dull the average man thinks there is nothing he can get along better without than new cranes. Of course he makes a big mistake, for that's the very time he must make his goods cheaper, but its hard to convince him of that. We've been there. We have convinced a good many and so have been making cranes all along through the hard times. But we should have sold more.



5-ton Steam-Hydraulic Crane in a Foundry.

Yet we have great faith in our crane. We know it does all we say and a great deal more, and so in spite of the business gloom that has hung over the land we have gone right along week after week speaking our little piece and paying the newspaper man's bill.

And what's the result? People have come to the conclusion that "Ridgway make the greatest crane in the country," and as business prosperity peeps around the corner we are crowded with inquiries for prices on cranes and elevators and the orders are beginning to roll our way.



Steam-Hydraulic Elevator, also made direct acting with cylinder under platform.

Men have found out that if they want the best crane there is for a Foundry or a Mill this wonderful Steam-Hydraulic crane is the only one to get. It is no longer an experiment, but hundreds are in use in the best plants all over the land. As a matter of fact there is not a Foundry or Mill can afford to be without it. Other types of cranes have been tried and found wanting. The Ridgway Steam-Hydraulic grows more popular the more it is used.

When the crane matter comes up in your plant we will certainly hear from you, and will name you satisfactory prices.

—

"PLEASE TAKE THE ELEVATOR."

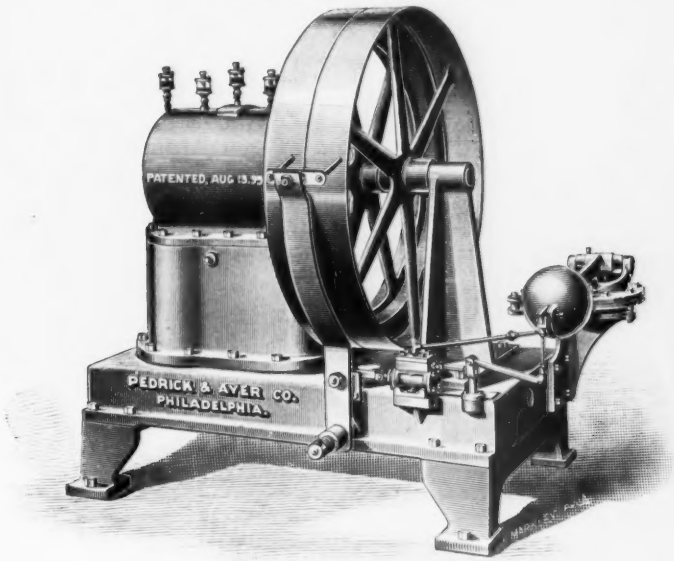
The only kind to use for limited lifts.

—

CRAIG RIDGWAY & SON, COATESVILLE, PA.

Automatic Compound Belt Air Compressors.

PATENTED AUGUST 13TH 1895.



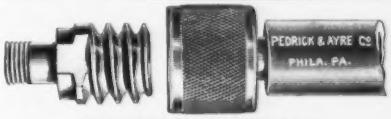
Straight Lift Hoist.

Built in two sizes, Nos. 1 and 2.

No.	Size of Cylinders in inches	Revolutions per Minute.	Cubic Feet of Free Air	Horse Power Required.	Size of Pulleys in inches	Shipping Weight of Compressor	Floor Space in inches	Telegraphic Symbol
1	11x 6 6x 6	100-100	32- 50	2-3½	40x5	2875 lbs.	60x40	Parian
2	1 x10 8x10	90-120	90-120	9-15	60x6	5370 lbs.	70x60	Parish

HORIZONTAL HOIST.

PAT. SEPT 4TH 1894



AIR HOSE COUPLING

For ½ inch, ¾ inch and 1 inch Hose.

These Compressors will compress more air at less cost than any other make, requiring no attention other than oiling; entirely automatic in action, stopping and starting as air is required. Specially adapted for foundry use. Can be run in series, if so, no stoppage impossible.

Horizontal Air Lift for low ceilings; for general lifting, quick in action and under perfect control of operator.

Straight Air Lift for foundry purposes when equipped with retaining and releasing valve, will hold the load whether heavy or light, in the desired position, as in case of lifting a ladle of molten iron and pouring it or raising a flask to knock out the sand. It can neither ascend or decend as long as connected to air supply.

Air Hose Couplings are designed to do away with long lines of hose. By having suspended along the air line a number of hose equipped with this device, connections can instantly be made or disconnected, allowing one hoist to serve in several places. Each size made in duplicate. Containing a shut-off valve.

Send for circulars and details to Pedrick & Ayer Co., Pneumatic Department.

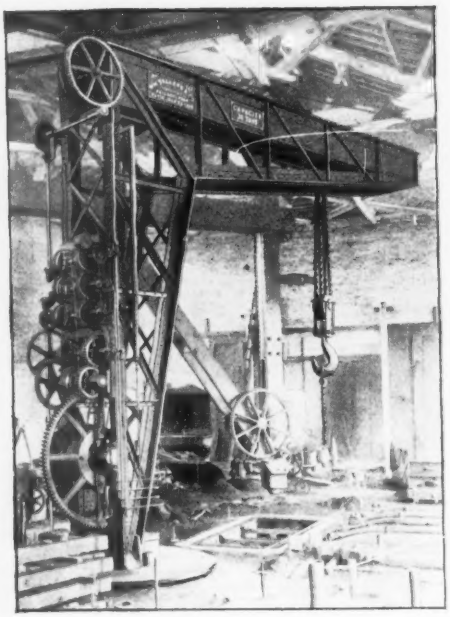
PEDRICK & AYER CO.

SPRING GARDEN STATION, PHILADELPHIA, PA.

William Sellers & Co., Incorp.

PHILADELPHIA.

MODERN FOUNDRY MACHINERY



In connection with our Machine Tool Business, we conduct a large foundry where practical tests are continually made of new labor-saving devices. The manufacture of

IMPROVED FOUNDRY CRANES

has become an important feature.

The accompanying illustration shows a quick-acting 30-ton Steam Jib-Crane, erected in the foundry of J. Morton Poole Co., Wilmington, Del., superceding old wooden cranes, one of which appears in the background.

This crane is driven by independent 8"x8" engines. The platform levers are near the floor. The effective radius of hook is 23 feet.

In future issues of this magazine, we will show illustrations of Jib and Traveling Cranes operated by electric motors.

Centrifugal Sand Mixer

Since the introduction and favorable reception of this effective, expeditious and economical **machine for preparing sand for molds and cores** we have simplified its construction and cheapened its cost. The capacity of the machine is remarkable, being limited only by the facilities for feeding sand into the hopper. Two men will easily shovel 5 tons an hour into the machine.

The qualities of "toughness" and "porosity" are materially improved by this process of preparing molding sand.

It will be better for you to think About this matter the way we want you to!

OF COURSE, you will say: "Here is that man Ayers tooting his own horn again." But, now, neighbor, could we have tooted it for nearly fifteen years without having been of some service and benefit to the foundry trade at large? NIT! We have rendered full value for every dollar that has been turned over to us, and

We are prepared to do it again!

WHEN

Your molders have drop-outs - - -
Castings are rough -
You find the sand cutting - - - -
Or a swell - - -
Everything fails -

YOU SAY

Put more gaggers in.
——— the facing.

Ram softer.
Ram harder.
Dry the molds.

THOSE ANSWERS ARE NOT RIGHT.

You are instituting economy at the wrong end. A good molding sand would do away with most of your troubles. There are more dirty castings caused by using a poor sand than by dirty iron. The difference in price is small; why not get the best?

If every man Attended to his Own business

He would get along better. We attend to ours. We make it a business to see that you get what you need. All sands subjected to our own personal supervision. If you want to see what we have got, just let us know and tell us what kind of work you want it for. We can send you any grade of **Molding Sand** you may require, from the finest to the coarsest, and guarantee quality always the same. Our No. 1 Sand has no superior that we know of for Stove Plate, Hollow Ware, Grey Iron and Malleable Castings; our No. 4 is the best Sand in use for Heavy Castings of any kind. It is an extra good wearer and is always sure to turn out a perfect casting. Our Crude Plastic Fire Clay is very refractory and guaranteed to work plastic readily in water.

ZANESVILLE SAND HAS A REPUTATION . . .

If you try us once, we will have you with us forever.

E. M. AYERS ⁂ MARKET BLOCK
ZANESVILLE, OHIO.

Over 10,000 in Use.

ALWAYS READY!

800 TO 2000 CANDLE POWER.

ESPECIALLY ADAPTED FOR

FOUNDRIES

PORTABLE, SELF-CONTAINED, AUTOMATIC.

NO SMOKE! NO SPRAY! NO SHARP SHADOWS!

Now in Valuable Use With Hundreds of Foundries

In addition to 400 Railroads and over 300 Contractors.

ROSS-MEEHAN FOUNDRY CO., CHATTANOOGA, TENN., May 5, '96.

The Wells Light M'f'g. Co., Nos. 44 and 46 Washington St., New York City:

GENTLEMEN—It is contrary to our rule to give testimonials, but an article with the merit of your Wells Light deserves to be made an exception. We have used your lights for the past five years, and consider them indispensible to us.

Yours very truly,
ROSS-MEEHAN FOUNDRY CO.
P. A. BRAWNER, JR., Sec'y. & Treas.

REQUEST CIRCULARS FROM

THE WELLS LIGHT M'F'G. CO.

EDWARD ROBINSON, Sole Proprietor.

MENTION THE FOUNDRY. 44-46 WASHINGTON STREET, NEW YORK.

"Plain Talk with Foundrymen."

ENTIRELY NEW!

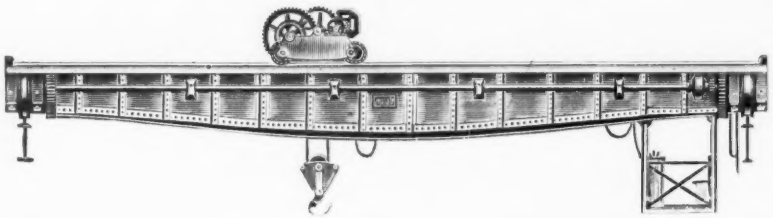
No work of this nature has ever before appeared in print.

A Complete Malleable Iron Treatise :

PRESENTING the latest up-to-date methods for the treatment of **Malleable Iron** in all its transitory stages, from the **raw material** to the **finished product,** including in its scope, **accurate analyses** for different mixtures, **detailed description of the construction and operation of the air furnace and annealing oven,** ordinary cupola practice, the grading and charging of pig iron and steel scrap, **brass and bronze mixtures and aluminum alloys,** giving a plain, reliable statement for instruction in malleable practice. Heretofore no condensed publication devoted to malleable casting has appeared. This book is replete with **UNWRITTEN TRADE SECRETS** so jealously guarded in the past, and of priceless value in mixing and annealing. It is a veritable encyclopedia, a rare gem. No foundryman can afford to be without it. It is available to employe as well as employer, and fairly glitters with analyses, tables, receipts and other valuable information for overcoming difficulties always encountered in malleable and gray iron founding.

Sent postpaid to any part of the United States or Canada, upon the receipt of $2.50.

ADDRESS J. F. BOYNTON & CO., ROCK ISLAND, ILL.



CRANES Traveling or Jib, Electric, Air, Steam, Hand. All kinds. Our Crane Catalogue shows them.

AIR HOISTS A moderate priced device of this kind (that handles your product twenty times faster than hand power can do it) pays good interest on your investment. Prices on request.

THE WHITING CUPOLA

The best melter of iron. Fourteen sizes. Read our Cupola Catalogue.

LADLES

Some new designs showing progress in the construction of these articles are illustrated in our General Catalogue.

Whiting Foundry Equipment Co.

HARVEY, ILL. (Chicago Suburb.)

Catalogue and Prices on Request.

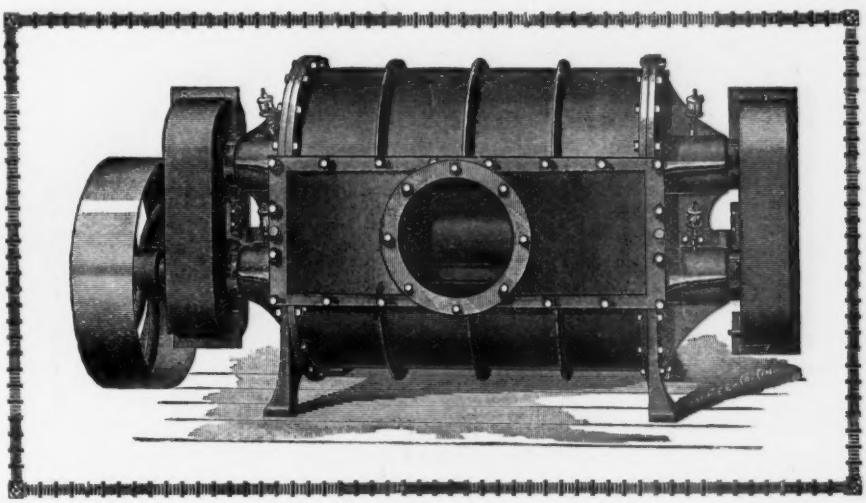
. . . OVER . . .

30,000

ROOTS' . .

Positive.. Pressure Blowers..

HAVE BEEN PUT
ON THE MARKET



OUR BLOWERS

Embody an experience of forty years' in the construction of machines of this type . . . . . .

P. H. & F. M. ROOTS Co.

CONNERSVILLE, IND.

NEW YORK OFFICE, 109 Liberty Street.

ROOTS'

Rotary Pressure Blower

Is used in almost every Country on the Earth's surface.

THEY REPRESENT

In their manufacture the concentrated experience and wisdom of some of the world's best mechanics and have become famous for the perfection of their workmanship, as well as their efficiency and economy.

PERFECTLY SATISFACTORY SERVICE.

Pittsburg, Pa., February 27, 1895.

P. H. & F. M. Roots Co., Connersville, Ind.:

Gentlemen—In reply to your inquiry of the 25th inst., we beg to say that we have been using your No. 4 Blower, without engine, for our cupola furnace, and it has given us perfectly satisfactory service.

Yours truly,
THE McCONWAY & TORLEY CO.,
C. P. Krauth, Sec'y.

ROOTS' BLOWERS FAR SUPERIOR.

Joliet, Ill., March 7, 1892.

P. H. & F. M. Roots Co., Connersville, Ind.:

Gentlemen—Replying to your favor of March 1st, we are pleased to report that the No. 6 Blower, purchased of you some time ago, has given us good satisfaction. We have used in our works both Fans and Blowers, but must confess that we consider the Roots Blower far superior.

Very truly,
BATES MACHINE CO.,
E. E. Wolcott, Asst. Supt.

EIGHT YEARS AND STILL IN FIRST-CLASS CONDITION.

Cincinnati, O., May 24, 1895.

P. H. & F. M. Roots Co., Connersville, Ind.:

Gentlemen—We take pleasure in stating that we have had 4 of your large Roots Blowers in use at our works for 8 years. These Blowers have given thorough satisfaction and are still in first-class condition.

Very truly,
THE ADDYSTON PIPE & STEEL CO.,
Eliot A. Kebler, Sec'y.

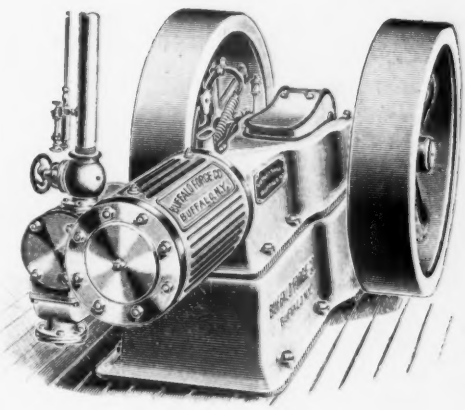
P. H. & F. M. Roots Co., Connersville, Ind.

NEW YORK OFFICE, 109 Liberty Street.

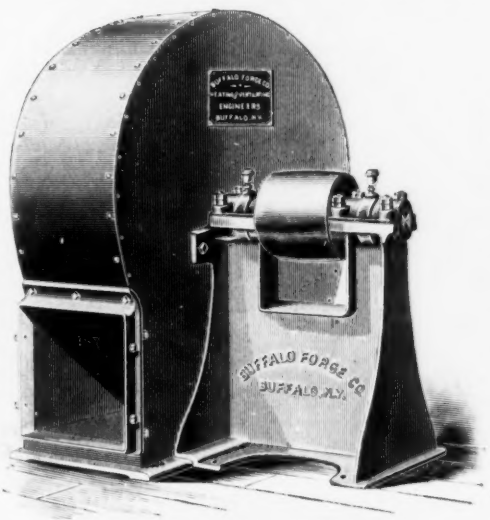
CUPOLA BLOWER.

For the latest development in Cupola Blower construction and application, see BUFFALO FORGE CO.'S 1896 Sectional Catalogue, "America's Best, the World's Standard."

BUFFALO FORGE CO.'S Automatic Cut-off Engine, Horizontal and Upright types for Electric Lighting and Power purposes, direct connected or belted. 1896 Sectional Catalogue furnishes full details.



CLASS "A" HORIZONTAL.



TUMBLING BARREL EXHAUSTER.

Tumbling Barrel Exhausters are easily applied, thoroughly efficient, and change casting cleaning rooms from a death-dealing pestilence to a comfortable working apartment. Send for details.

BUFFALO FORGE CO.,
BUFFALO, N. Y., U. S. A.

CHICAGO, 22-24 W. Randolph St. NEW YORK, 26 Cortlandt St.

"SYRACUSE" Steel Wheelbarrows

FOUNDRY BARROW

Ten Nos.

All dump forward and stand on end, saving room in storage. Best constructed and best balanced Barrow made.

The Tray is of best quality Steel, of uniform thickness save at corners, which are of double thickness, being smoothly lapped and riveted. The edges are rolled over a band of steel riveted under the flange. The Legs have renewable Steel Shoes. Patent Steel Wheel with Staggered Spokes. Heavily braced throughout. The most durable and easily handled Barrow made. Steel Charging and other Barrows in variety. Send for handsome Illustrated Barrow and Truck Catalogue No. 6

SYRACUSE CHILLED PLOW CO., Syracuse, N. Y.

Crucibles AND Plumbago

Progress is the order of the day and our improvements have been so marked that we have attained as high as 90 heats, as per testimonial attached.

New Orleans, La., Feb. 13, 1896.

HUSSMAN CRUCIBLE CO., St. Louis, Mo.:

Dear Sirs—Kindly send me four (4) No. 70 and four (4) No. 80 Crucibles. I think I have established a record for Plumbago Crucibles. I took out an even 90 heats from one of your No 70 Pots. Trusting you will give this order your immediate attention, I am,

Very truly yours,

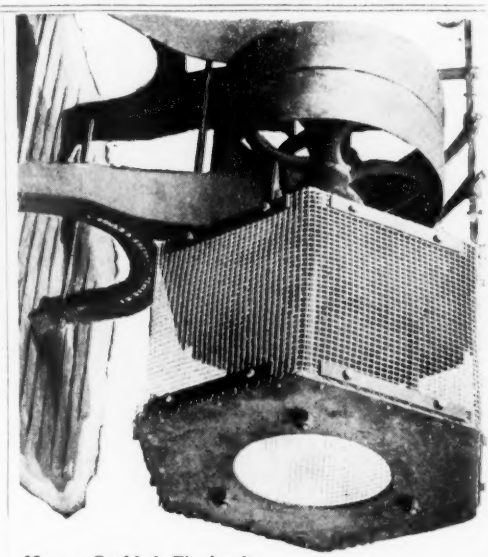
F. H. KORETKE,

922 Magazine Street, New Orleans, La.

CEYLON PLUMBAGO is the best for Facings, Lubricant, etc., and our prices the lowest.

Hussman Crucible Co.

ST. LOUIS, MO.



Messrs, Gould & Eberhardt:

NEWARK, N J. Aug. 19, 1896.

GENTLEMEN:- I have two of your Sand Sifters in use, and find them an excellent device for the preparation of Core and Facing Sand, as they sift and mix thoroughly, run with small amount of power, save the labor of one man even when run intermittently, and require but little care to keep in order. The finer seive is used as a dry Sifter and Mixer, the coarser one as a Mixer after the material is wet down. Yours truly,

S. J. MEEKER.

GOULD & EBERHARDT, NEWARK, N. J.

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.75 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month,	$20.00
Half page - - -	"	12.00
Quarter page - -	"	7.00

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements must be in by the 20th of the month preceding publication to insure insertion.

The Coburn Patent Trolley Track

PARLOR DOOR HANGERS.

The adjustment is in the Track and not in the Hanger, as are others.

☞Send for Book.

The Coburn Patent Trolley Track

BARN DOOR HANGERS.

Impassible for door to jump the track. Very simple and cheap to apply.

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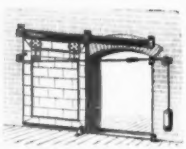
The Coburn Patent Trolley Track



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Recommended and adopted by fire underwriters all over the United States.

☞Send for Book.

The Coburn Patent Trolley Track

Overhead Tramway

Furnished complete with straight and curved track, switches, frog brackets, single and double carriers.

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The Coburn Patent Trolley Track

—AND—

Patent Rolling Ladder Systems

Over 10,000 in use in the U. S. Roll suspended from ceiling or facing the shelves.

☞Send for Book.

The Coburn Trolley Track Mfg. Co.,

HOLYOKE, MASS.

ARE YOU TROUBLED

With Blow Holes in Iron Castings?

TRADE "SMOOTH ON" IRON T COMPOUND CASTINGS MARK

Do you have Small Imperfections in Iron Castings?

IF SO.

Tompkins' "Smooth on" Castings Iron Compound

IS WHAT YOU WANT.

VREELAND TOMPKINS, Manufacturing and Analytical Chemist . . .

551 COMMUNIPAW AVE., JERSEY CITY, N. J.

THE BRASS FOUNDERS SUPPLY CO.,

(Formerly R. M. BARNETT CO.)

Makers of

FLASKS
FURNACES
FOUNDRY

Supplies and Specialties.

The Improved

RIB, BEVELED, and Special Designs.

ORDER THE RIBBED IT IS BEST!

Stronger and Cheaper than any others.

Write for Catalogue.

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Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass.
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Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
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American Glutrose Works, Philadelphia, Pa.

CORE OVENS.
Millett Core Oven Co., Brightwood, Mass.

CORE OVEN CARS.
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Hussman Crucible Co., St. Louis, Mo.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co. Robert J., Philadelphia, Pa.

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Diamond Clamp & Flask Co., Richmond., Ind.
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Whitehead Bros. Co., New York.
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Paxson & Co., J. W., Philadelphia, Pa.
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Springfield Facing Co., Springfield, Mass.
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Springfield Facing Co., Springfield, Mass.
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Hussman Crucible Co., St. Louis, Mo.
McCullough-Dalzell Co., Pittsburg, Pa.
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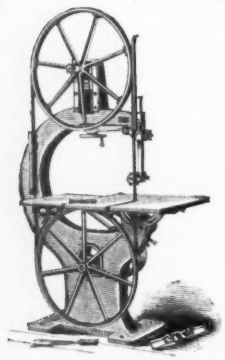


34 in. and 36 in. Band Saw Machine.

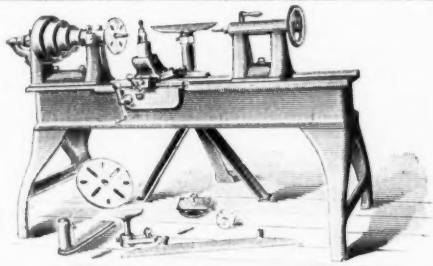
.. Complete Outfits ..

FOR

Pattern Shops

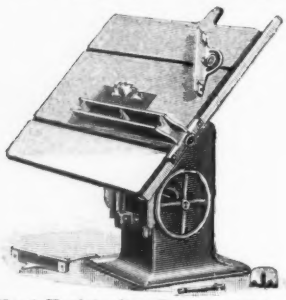
STRICTLY FIRST-CLASS TOOLS.

MANUFACTURED BY

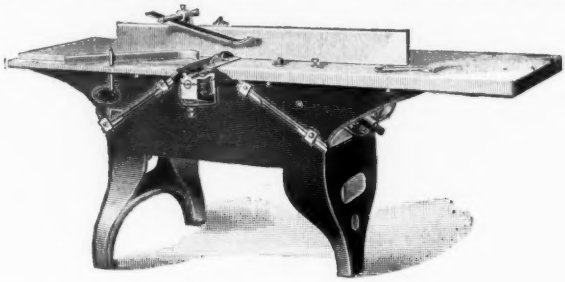


Pattern Makers' Lathes. Iron Bed with or without Carriage.

THE FRANK H. CLEMENT CO. 336 LYELL AVENUE, ROCHESTER, N. Y.



No. 1 Variety Saw Bench. All iron and steel.



Look at the Wood We Burn into . . **CHARCOAL**

NO WONDER OUR

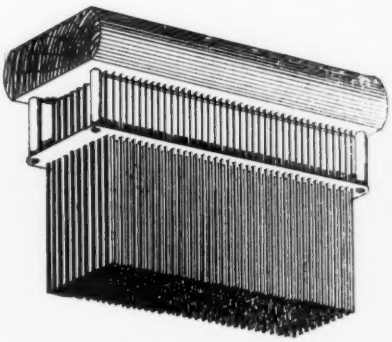
CHARCOAL FACING

is used in so many Brass and Stove Foundries.

LET US TALK IT OVER WITH YOU.

Springfield Facing Co. SPRINGFIELD MASS.

Well, it doesn't look like anything you ever saw before



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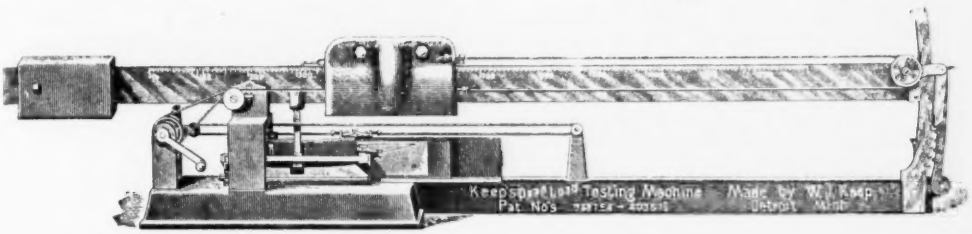
Guaranteed Satisfaction or Money Back. You Take no Risk.

SPECIAL FEATURES.—Backs all in one piece; the wires uniformly distributed; each wire separately held and protected from excessive strain by a perforated tin plate; maximum stiffness with maximum elasticity; back with rounded sides; lightness combined with strength; elegance with usefulness; best material with finest workmanship; great durability at a moderate cost.

THE BUCHEL BRUSH CO., New Orleans, La.

St. Louis Agents—Todds & Stanley Mill Furnishing Co.

"Keep's Test" Apparatus.



HERE IS WHAT ONE LARGE CONCERN SAYS:-IT HAS PAID THEM, WHY NOT YOU?

DETROIT, MICH., March 31st, 1896.

Mr. W. J. Keep, City:

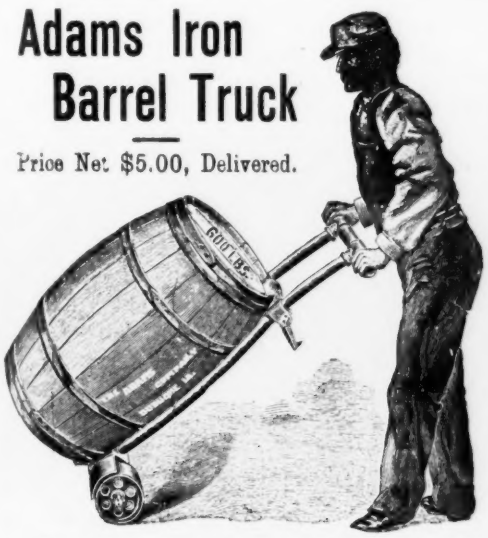
DEAR SIR: We have regulated our foundry mixture by "Keep's Test" during the past year, and can recommend it in highest terms. We know exactly what we are doing and can keep our castings of uniform quality. We find that .160 inches per foot the best shrinkage, and have been able to keep the average strength of a test bar ½ inch square and 12 inches long at 450 pounds.

Very truly yours,
LELAND & FAULCONER MFG. CO.,
H. M. LELAND, Vice-President.

To SAVE MONEY IN YOUR OWN FOUNDRY, ADDRESS **W. J. KEEP, Detroit, Mich.**

Adams Iron Barrel Truck

Price Net $5.00, Delivered.



One man can attach and move **heavily** loaded barrels, with or without heads, not touching the barrels with his hands.

More description furnished on application.

Manufactured by

THE ADAMS COMPANY, DUBUQUE, . . . IOWA.

ESTABLISHED 1854.

Brooklyn Fire Brick Works

CUPOLA BLOCKS, FIRE SAND, FIRE CLAY, FIRE MORTAR, KAOLIN

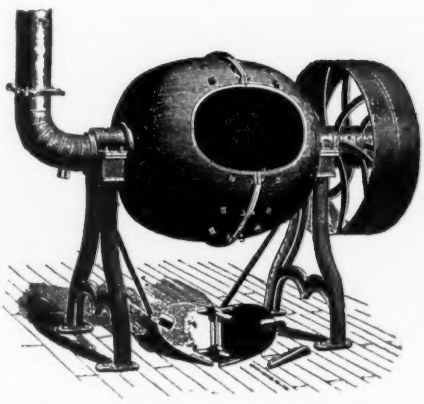
AND ALL FIRE MATERIAL REQUIRED FOR FOUNDRY PURPOSES.

Send for Illustrated Catalogue and Prices.

88 Van Dyke Street, BROOKLYN, N. Y.

STOVER'S IMPROVED

EXHAUST TUMBLING BARREL



The Stover Egg Shaped Barrel does double the work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron wire nails, or any other small articles that require cleaning and polishing.

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Stover Manufacturing Co.

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We make patterns cheaper, better and in a fraction of the time required to get them out elsewhere. Do you realize that a small pattern shop is a nuisance? It is either a feast or a famine all the time. The Gobeille Pattern Co., Cleveland, Ohio.

Plank your dollar down, heads or tails!

That is the way many a cartwheel has rolled away from you. You took chances and came out at the small end of the horn You can't gamble on a sure thing, nor loose money either. There are but few such things, mighty few, THE FOUNDRY is one of them. No gambling when you plank your dollar down for it. No chance work. You are bound to improve and that immediately. A Foundryman who can do as well without it—neighbor, we never heard of him. Send us his address and he will thank you for it—so will we.

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

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Incorporated

PIG IRON, STEEL, COKE, ETC.

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Manufacturers, Importers
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Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

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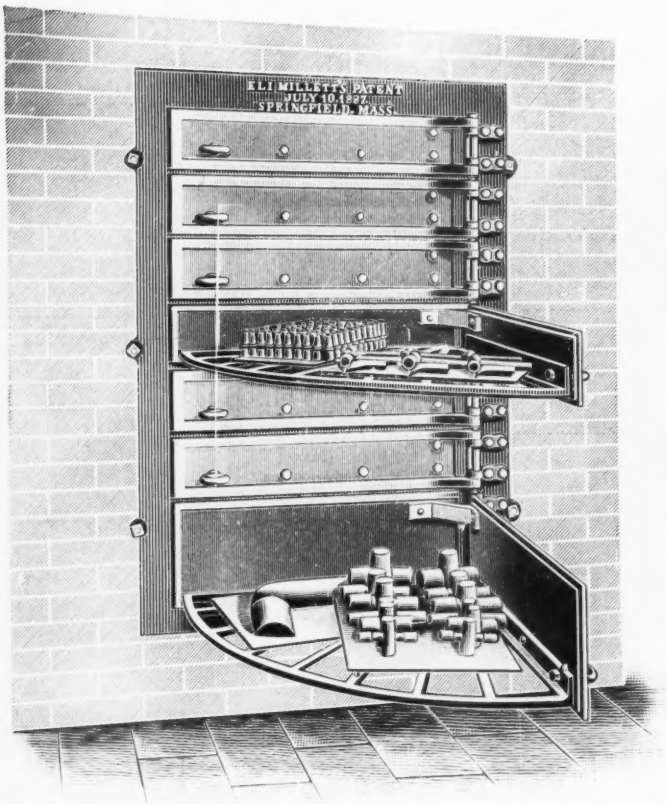


Millett's Patent Core Oven

THE BEST IN THE WORLD

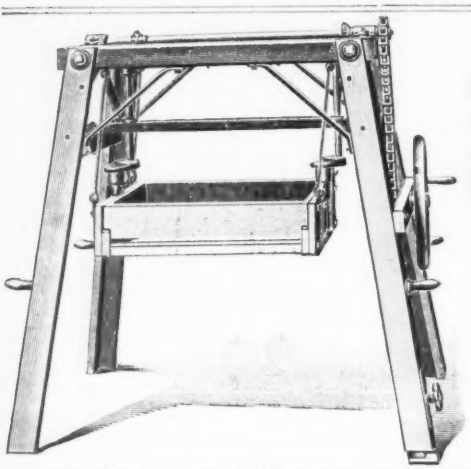
No Foundry using small cores can afford to be without it.

Over one hundred and fifty in use.

Send for our new Catalogue giving names of those using them.

Millett Core Oven Co.

BRIGHTWOOD, MASS.



THE PERFECT

Sand Riddling Machine

This is the Best, Simplest, Cheapest, Most Durable and Most Easily Operated Sand Riddling Machine made.

For full particulars and references, address,

THE SPRINGFIELD FOUNDRY CO.

SPRINGFIELD, OHIO.

IT IS NOT OUR FAULT

If you are continually in trouble. Book learning goes hand in hand with practical experience. The man who says it does not—just look at his shop and see what his business amounts to. We can supply you with all Standard Works pertaining to Foundry Practice . . . . . .

HELP YOURSELF

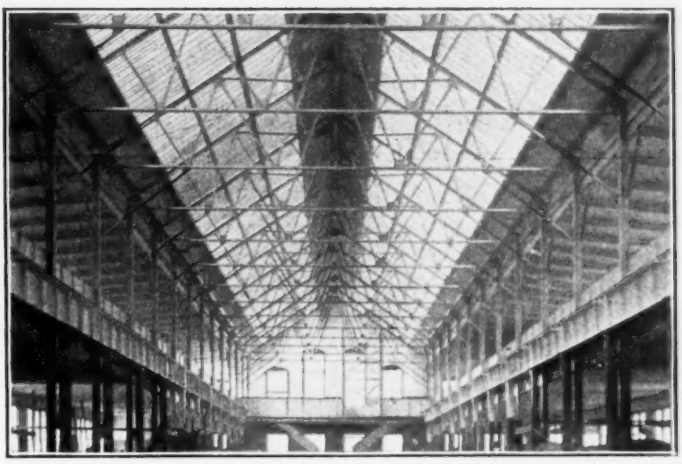
THE FOUNDRY.
Detroit, Mich.

When planning for additions or repairs to your buildings . . this spring . . . .

DO NOT FORGET to write us for information regarding .

TRANSLUCENT FABRIC

SKYLIGHTS



They are especially adapted for . . . .

Foundries

Because they cannot break, never leak, require no repairing, and are inexpensive to build . . . . .

CATALOGUE and SAMPLES FREE

TRANSLUCENT FABRIC CO. ❀ QUINCY, MASS.

Clinton Iron & Steel Co.

"FAIR DEALING" Their Motto.

MANUFACTURERS OF

"CLINTON" AND "HECTOR"

INSPECTED FOUNDRY IRONS . . . . .

ALSO

Sole Factors for DUNBAR STRONG IRON

In New York and New England.

None but the Best Southern Irons Sold.

FURNACES, PITTSBURGH.

NEW YORK OFFICE, No. 15 Cortlandt St.

Why deal with Commission people or Agents who give fancy names to Irons and know nothing about their manufacture.

DEAL WITH THE MANUFACTURER DIRECT.

GLUTROSE

(Trade Mark.)

The Universal Liquid Core Compound

Patented in the United States, England, France and Belgium.

GLUTROSE was invented and is manufactured by a practical foundryman of many years' experience. It has been used in the Pennsylvania Railroad Foundry at Altoona and other large foundries for the past three years with the most satisfactory results.

It is cheaper and better than flour, rosin, oil or any other compound in use, takes the place of all other materials and never varies in quality.

Makes the most difficult cores for iron or brass of any size.

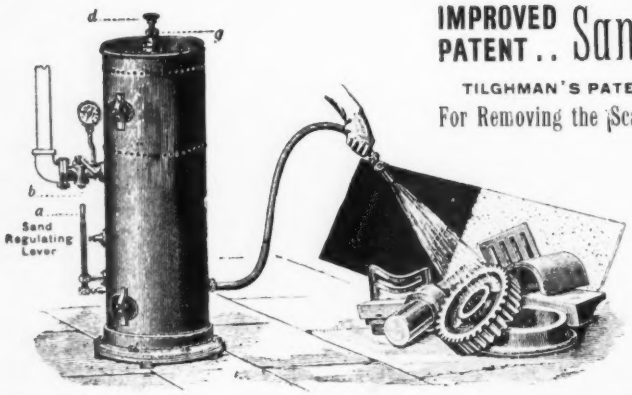
The cores come out easily and leave the castings smooth.

Will let the air and gases off from a core which is difficult to vent better than any other material in use and makes no offensive smell or smoke.

WILL NEVER BLOW THE CASTINGS.

AMERICAN GLUTROSE WORKS

OFFICE:
PENN MUTUAL BUILDING,
No. 925 Chestnut Street, Philadelphia.



IMPROVED PATENT.. Sand Blast Machinery

TILGHMAN'S PATENTS MATHEWSON'S PATENTS.

For Removing the Scale from Iron and Steel Plates.

Cleaning Castings, Forgings, etc.

WARD & NASH,

SOLE AGENTS,

35-37 So. Canal Street, CHICAGO.

23-25 Purchase St., BOSTON.

Send for Catalogue.

There Are Others!

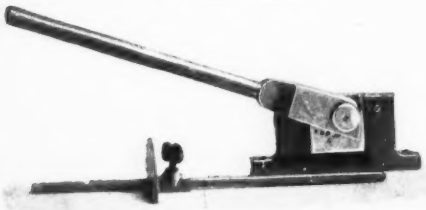
But none like this one.

LET US TELL YOU OUR STORY.

DIAMOND CLAMP & FLASK CO. RICHMOND, IND.

Every Foundry and Machine Shop

Should have a



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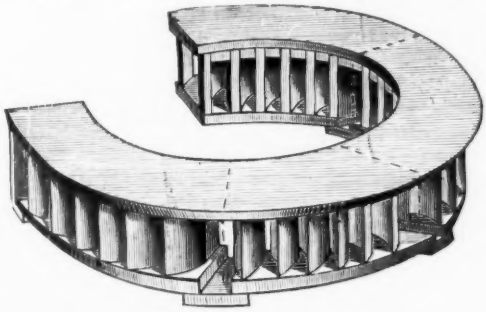
The "DANDY" embodies all the latest improvement in this line. Has an adjustable guage and has all the cutting parts made of best tool steel. Costs $5.00 and will pay for itself in a few weeks, perhaps less.

—THE—

ROBBINS & MYERS CO.

SPRINGFIELD, OHIO.

Adopted by the U. S. Navy Department.



The combination of Sections of Tuyeres as placed in wall.

How About

a new cupola now that "good times" are in sight? That old one, which you have been patching up since the panic of '93, cannot stand the strain much longer. If you want the best possible results as regards economy of fuel, rapid melting and a uniform strength of castings, not to mention the **lowest price**, it will pay you to investigate the **BLAKENEY.** The secret is in **perfect combustion.** The **continuous curved tuyeres** assures that in the highest degree. Let us send you a descriptive circular.

THE SPRINGFIELD CUPOLA CO.

SPRINGFIELD, OHIO.

Between your neighbor and yourself

YOU have managed to get through some pretty hard squeezes. Still how often have you not wished for a third party to help you out? So many things about a foundry which require more than two heads to get over. The experience of a practical man is worth a great deal when you need it, and no one knows better than yourself how often you do need it. The latest work of **THOS. D. WEST'S:**

Metallurgy of Cast Iron . .

IS the most complete exposition of the more complex questions arising in the management of foundries. It contains 573 pages and 106 illustrations relating to

CUPOLAS, IRON AND FUEL.

The price is $3.00—the cheapest consultation fee you ever paid. Shall we send you a copy?

THE FOUNDRY PUBLISHING CO.

DETROIT, MICH.

THE SUPERIOR CHARCOAL IRON COMPANY

Exclusive Dealers in the following well known brands of

ANTRIM, ELK RAPIDS,
GAYLORD, HINKLE,
PIONEER, PENINSULAR,
UNION, SPRING LAKE.

Lake Superior Charcoal Pig Iron

All business connected with the sale of the above brands of Charcoal Pig Iron will, from April 1st, 1897, be handled by **The Superior Charcoal Iron Co.**, of Detroit, Mich., which is thus enabled to supply the best iron known for all purposes, and especially for Car Wheels, Malleable Castings, Boiler Tubes, Ship and Armor Plate, Strong High Silicon for Foundry purposes, Basic Iron with the minimum of Silicon and Sulphur, also Iron to take the place of Salisbury, Southern and Swedish Charcoal Iron.

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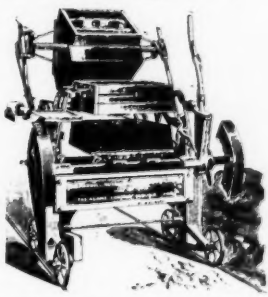
Office. 66 Newberry Building, DETROIT, MICH.

FARWELL'S MOULDING MACHINES Send for Catalogue



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YOU MUST REACH THE RIGHT.. SPOT!

To make your advertising effective. You would only be throwing your money away trying to reach the people of New York through a Chicago Paper. In the same manner, how can you expect to reach the foundry trade except through a foundry paper? THE FOUNDRY goes to more foundries and is read by more foundrymen than all the Trade Journals in America combined . . . . . .

IT REACHES THE RIGHT . . . . SPOT!

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FACINGS
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We are Headquarters for Sea Coal, Plumbago, Soapstone Facings, Blackings and Supplies.

. . SOLE MANUFACTURERS . .

F. F. PURE PLUMBAGO FACING.

☞ *Send for Testimonials of it.*

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FACTORIES:—PITTSBURG AND MAUCH CHUNK, PA.

FOUNDRY MOLDING MACHINES,
STRIPPING PLATE MACHINES,
PORTABLE, AIR-POWER, MACHINES,

USING WOOD OR METAL SPLIT PATTERNS, WITHOUT STRIPPING PLATES.

Write for information.

The Tabor M'f'g Co.,

ELIZABETH, N. J.

ESTABLISHED 1875.

STOW MANUF'G CO.,

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INVENTORS OF THE

FLEXIBLE SHAFT

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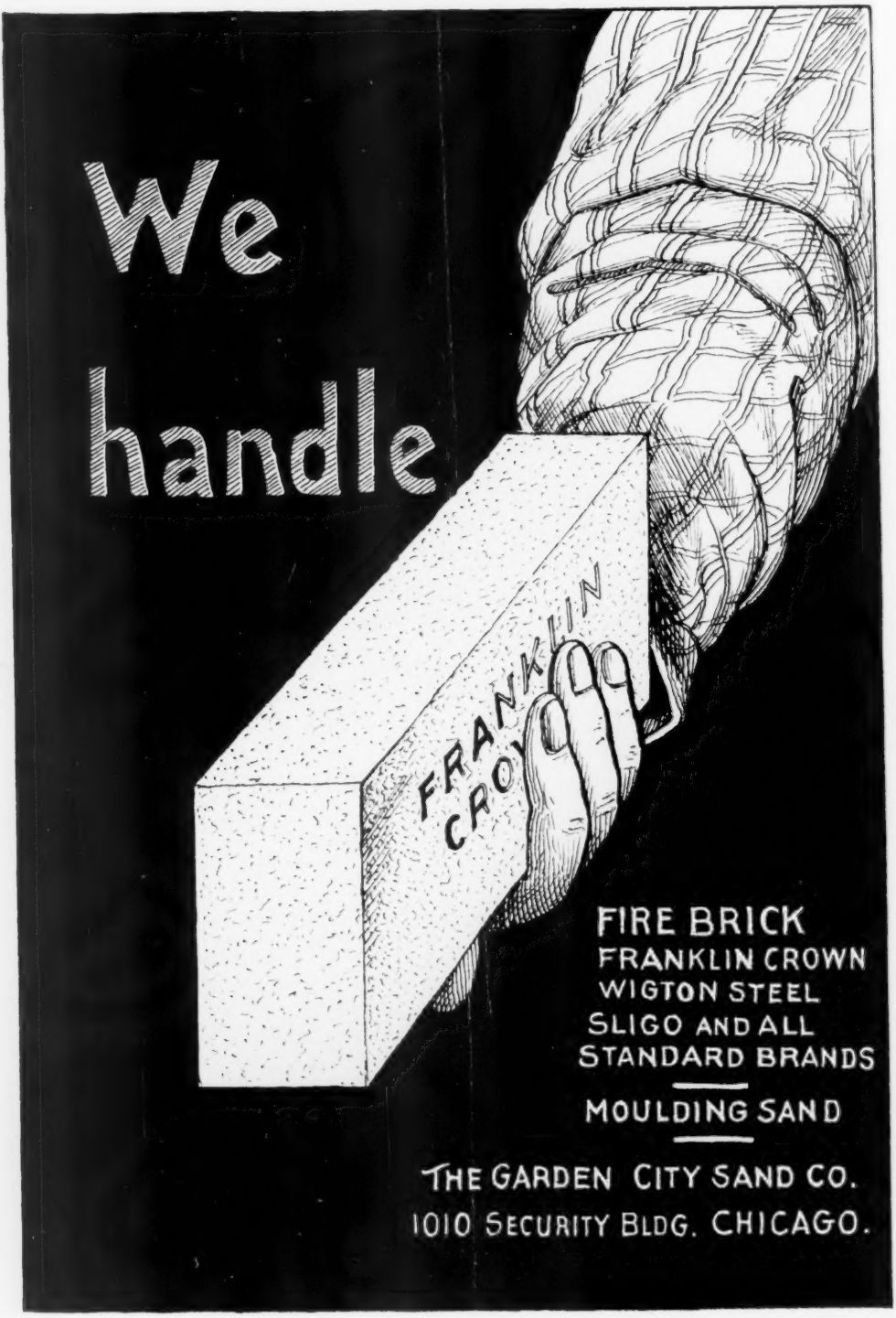
The oldest and largest manufacturers in the world

PORTABLE EMERY GRINDER

Take the tool to the work and save heavy handling.

WRITE US FOR CATALOGUE AND PRICES.


We handle
FRANKLIN
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STANDARD BRANDS
MOULDING SAND
THE GARDEN CITY SAND CO.
1010 SECURITY BLDG. CHICAGO.

THE S. OBERMAYER COMPANY desires to congratulate the American Foundrymen's Association on the progress it has made during the past year and upon the apparently bright future in store for it. As we are so closely identified with the foundrymen of America, we cannot but regard with the greatest favor any move made that has for its object the improvement of present conditions. It is hardly necessary for us to say that we can be relied upon always to do our part in advancing their interests. Their liberal recognition at all times of our zeal in aiding them in every possible way, to turn out high grade work is as gratifying to us as we are sure our effort has been to them. With best wishes, we remain, THE S. OBERMAYER COMPANY

THE S. OBERMAYER COMPANY

THE LARGEST AND STANDARD FOUNDRY SUPPLY HOUSE OF THE WORLD

WE • MENTION • A • FEW

Manufactures, Supplies and Equipments which we carry in stock—Ceylon Plumbago, India Silver Lead, Founders' Perfect Wash, Heavy Machinery Blacking, Heavy Stove Plate Facing, National and Eagle Return Facing, Soft, Hard and Steel Wire Brushes, Brass, Galvanized and Steel Wire Riddles, Bellows, Shovels (all grades), Coke Forks, Molders' Tools, Wheelbarrows, Snap Flasks, Pattern Letters, Ladles, Crucibles, Emery Wheels, Sea Coal, Stone Coal, Bituminous Facing, Core Compound, Soapstone, Foundry Flour, Talc, Bolted Cement, Foundry Molasses, Fluor Spar, Stove Putty, Silica, Brass Sand. All goods guaranteed. Trial samples free. THE S. OBERMAYER COMPANY, Cincinnati, Ohio.

Factories at Cincinnati, Ohio, Chicago, Ills., Larimer, Pa., White Haven, Pa.

A Word

as to

Joseph Dixon Invented the Plumbago Crucible

DATE OF INVENTION
1826.

Dixon's Crucibles have been in the Market SEVENTY YEARS.

Dixon's Plumbago Crucibles

Dixon's Crucibles are Standard all over the **GLOBE.**
Dixon's Crucibles are used in every country on the Globe where metals are melted.
Dixon's Crucibles have the highest records for **HEATS.**
Dixon's Crucibles are made to get

BEST RESULTS WITH THE LEAST COAL.

Dixon's Crucibles are made of many mixtures to suit all kinds of work.
Dixon's Crucibles are made special for Steel Melting.
Dixon's Crucibles are made special for Nickel Melting.
Dixon's Crucibles are made special for Brass Melting.
Dixon's Crucibles are made special for Composition Melting.
Dixon's Crucibles are made special for Phosphor Bronze Melting.
Dixon's Crucibles are made special for German Silver Melting.
Dixon's Crucibles are made special for the Melting of Precious Metals.

In ordering you will be benefitted by mentioning the kind of Metals melted. Write for pamphlet **"How to Use Plumbago Crucibles."** The best are the cheapest, as they must stand the punishment of high heat and much wear and tear. The "Dixon" records in average efficiency, in general good behaviour and in volume of sales, far in the lead.

Jos. Dixon Crucible Company,

JERSEY CITY, N. J.

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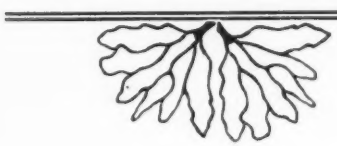
DEALERS IN

Molding Sand



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FOUNDRY FACINGS
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OF ALL KINDS.
LEAD FACINGS
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Established 1872. Incorporated 1895.

McCullough-Dalzell Company

PITTSBURGH, PA.

CRUCIBLES for Brass Melting .
CRUCIBLES for Steel Melting .
CRUCIBLES for All Purposes . .
CRUCIBLES of All Sizes . . .
STOPPERS, Twenty-one Styles .
LIDS, COVERS, CAPS, . . .
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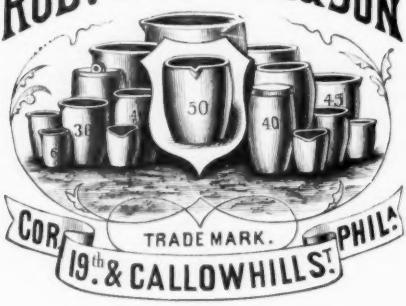
PLUMBAGO FINE DUST . . .

ALL
ARTICLES
CONTAINING
PLUMBAGO

Crucible.

ROBT. J. TAYLOR & SON



Crucible

Dipper.

Cover.

Stopper.

Crucibles

For melting Steel, Brass, Copper, Gold, Silver, Nickel and Metals and Alloys of Every Description; Small Crucibles for making Assays and fine pure Plumbago for lubricating, etc.

We are practical workmen and have studied the requirements of the different metal works in this country, as well as in Europe. We also work strictly by chemical analysis, giving a uniformity at all times never before approached in this or any other country.

We make All Sizes, from 8 oz. to 2 ton Capacity.

ROBT. J. TAYLOR & SON,

1900 to 1916
CALLOW HILL STREET, PHILADELPHIA, PA.

We Guarantee..

That one man with one of our **PNEUMATIC HAMMERS** can do more and better work than four men working in the ordinary way.

These same Hammers are also especially adapted for calking boilers and beading flues.

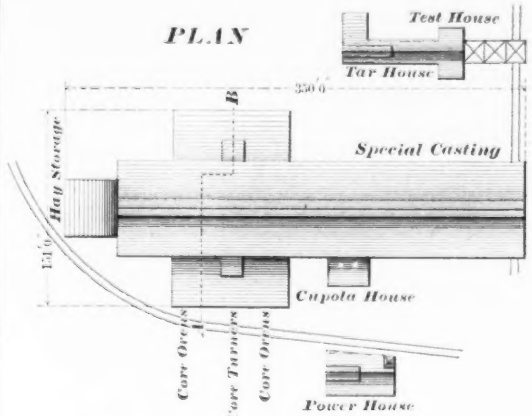
We also manufacture the best Air Drill on the market, and our Air Hoist and Compressors are especially designed for foundry work.

All tools sent on ten days' trial, subject to approval and are guaranteed for one year.

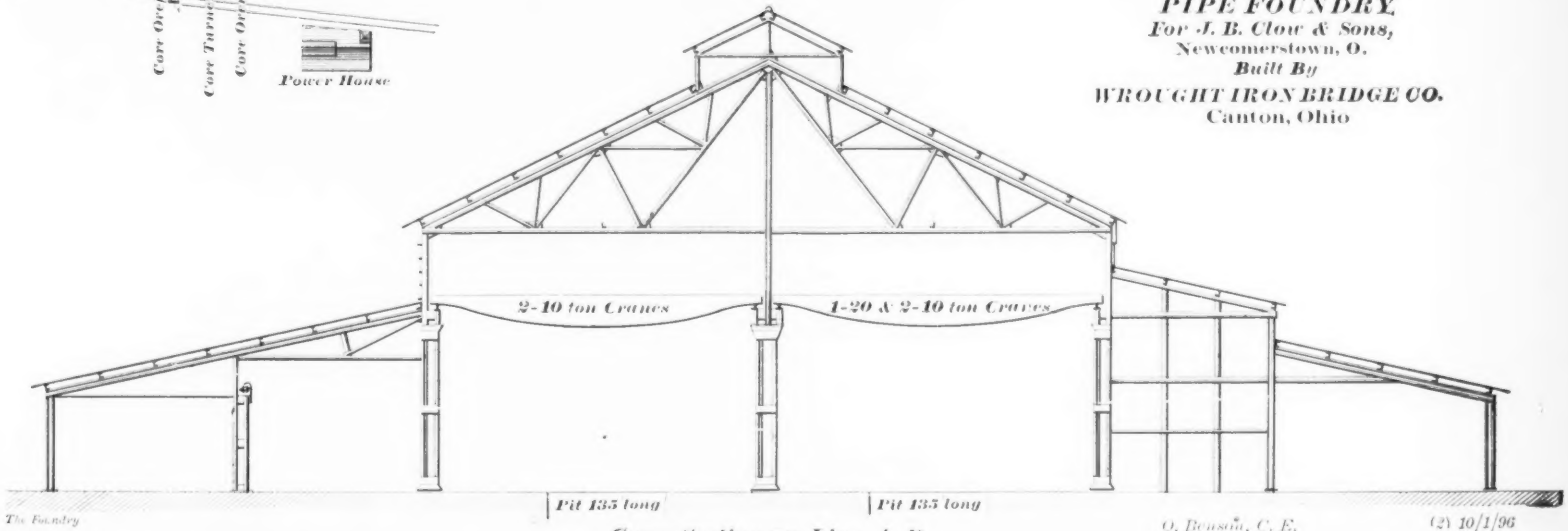
Chicago Pneumatic Tool Co.,

635 Monadnock Building, CHICAGO, ILL.

WROUGHT IRON BRIDGE CO.



PIPE FOUNDRY
For J. B. Clow & Sons,
Newcomerstown, O.
Built By
WROUGHT IRON BRIDGE CO.
Canton, Ohio



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Structural Engineer

(2) 10/1/96

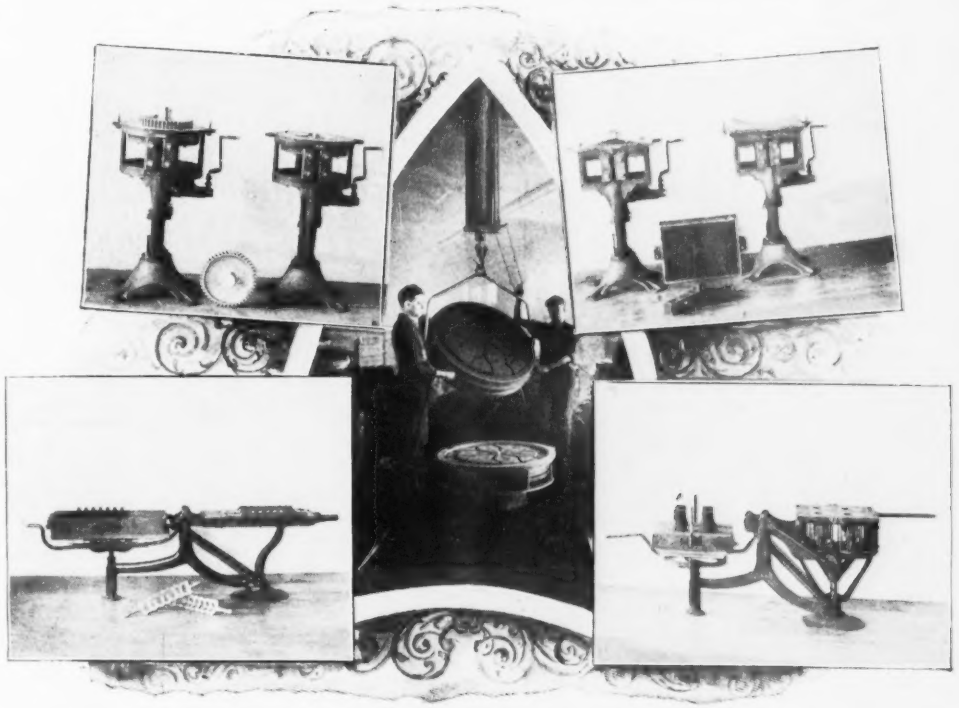
We design and construct Foundries, Machine Shops and similar structures. Also Roofs, Turntables and Bridges of every description.

Principal Office and Works at Canton, O.
Branch Offices at New York, Chicago, Indianapolis and Kansas City.

MOLDING MACHINES

FOR ALL CLASSES OF WORK.

STRAIGHT DRAW, ROCKOVER, AUTOMATIC DRAW ROCKOVER,
IN OVER TWENTY DIFFERENT SIZES,



Guaranteed to pay out in Six Months When run to their full capacity.

The Pridmore Molding Machines

INSURE BETTER AND MORE UNIFORM CASTINGS.
LESSEN COST OF MACHINE WORK ON CASTINGS.
LIGHTEN THE LABOR AND SIMPLIFY FOUNDRY METHODS.
SAVE FIFTY TO SEVENTY-FIVE PER CENT.

Those having Grey Iron or Brass Castings to make in reasonable quantities, will do well to write for full information and lists of many foundries now using these machines. Estimates, prices, terms, etc., will be promptly furnished. Rights to use these machines for Malleable Iron and Steel Castings are reserved. Address,

HENRY E. PRIDMORE,

111-113 W. Harrison St., CHICAGO, ILL., U. S. A.

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THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

Iron and Steel Bridges, Roofs and Buildings.

The above illustration is taken direct from a photograph and shows the construction of a foundry building built by us for The Lake Erie Engineering Company, at Buffalo, N. Y. The building is 106 feet in width, the central portion being 50 feet, with a wing on each side 28 feet in width. The center is controlled by a power crane, with a travel the full length of the building. Light is secured from skylights in the roof. The building is covered with slate on iron purlins, no wood work being used about the construction.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

GLUTROSE

(TRADE MARK.)

THE UNIVERSAL LIQUID CORE COMPOUND. PATENTED IN THE UNITED STATES, ENGLAND, FRANCE AND BELGIUM.

Glutrose was invented and is manufactured by a practical foundryman of forty years' experience, Its merits are an established fact, and it has been used in the Pennsylvania Railroad foundry at Altoona, and other large foundries for the past three years with the utmost satisfactory results.

Glutrose is cheaper than flour, oil or any other core compound used. One 50-gallon barrel will go as far as four barrels of the best flour. Will keep any length of time, and improves with age.

Never varies in quality, whilst flour is always varying.

Cannot be *wasted*, as when too much is used, making the sand too wet to work well, *more dry sand* must be added, thus correcting the fault without waste.

Glutrose makes the most difficult and complicated Cores for iron, steel or brass Castings of any size.

Dries open and porous inside and hard on the outside, yet the metal will lie well to it.

Leaves the Castings smooth and the cores come out easily.

Does *not readily* absorb *moisture* from the mold.

Makes no offensive smell or smoke.

Will *never make the Core larger than the core-box.*

Will let the air and gases off from a Core which is difficult to *vent* better than any other material in use.

CLAIM FOR GLUTROSE.

Will never Blow the Castings.

Of the Many Testimonials Received, we Submit the Following:

Damascus Bronze Co., Manufacturers Engine, Car and Machinery Castings.

Pittsburg, May 10, 1895.

American Glutrose Works—Gentlemen: I have been using your American Glutrose as a substitute for molasses and flour, and find that you are the good Samaritan that we foundrymen have been looking for these years back.

In my forty years' experience, both as a workman and Manager of the largest Bronze Foundries in the United States, I have never found anything to mix in core sand equal to Glutrose. It not only cheapens the mixture of core sand, but saves the foundryman one-half the cost in cleaning out the cores of heavy castings, and assures solid castings free from blow holes, and gives a stronger core than any of the old time mixtures of molasses and flour, which I have always considered detrimental to foundry use. You can refer any of the foundry trade to me for reference, and I will cheerfully tell them of all the good virtues possessed by Glutrose.

Respectfully yours,
DAMASCUS BRONZE CO.,
J. T. Brown, Manager.

A. Whitney & Sons, Car Wheel Works, Cellowhill, 16th and 17th Streets.

Philadelphia, Pa., July 22, 1895.

American Glutrose Works:—Gentlemen: Replying to your request for a testimonial as to the merits of Glutrose Core Compound, would say that we have used it exclusively for our cores since 1893, and have every reason to be satisfied with it, both as to its economy and with the results attained with a minimum amount of trouble in mixing. We trust you will be successful in its sale.

Yours truly,
A. WHITNEY & SONS, per Thos. B. Whitney.

Macbeth & Co., Iron for Buildings.

Cleveland, O., March 27, 1896.

American Glutrose Works, Philadelphia, Pa.:

Gentlemen—We have used "Glutrose" for several months for difficult cores, and find it makes much better cores than we can make with flour. Cores vent easier, are easier to remove from the castings and do not blow. We can recommend it as being entirely satisfactory.

Yours very truly,
MACBETH & CO., Wm. Cross, Foreman.

Send for Samples and Price.

AMERICAN GLUTROSE WORKS,

Office, Penn Mutual Building,

Factory, Camden, N. J.

925 Chestnut St., Philadelphia.

Rogers, Brown & Co.

PIG IRON

W. A. ROGERS, Buffalo.
ARCHER BROWN, New York.
D. B. MEACHAM, Cincinnati.
W. C. HERRON, Cincinnati.
M. C. ARMOUR, Chicago.
ROGERS, BROWN & CO., Cincinnati.
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ROGERS, BROWN & CO., Boston.
ROGERS, BROWN & CO., Cleveland.
ROGERS, BROWN & WARNER, Philadelphia.
ROGERS, BROWN & WARNER, Pittsburg.
ROGERS, BROWN & MEACHAM, St. Louis.

STATEMENT OF SALES.

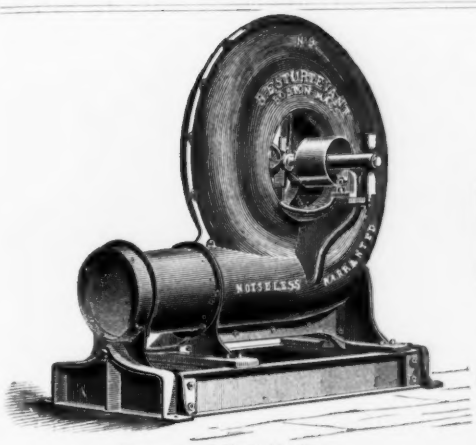
1895		1896.	
Pig Iron	585,874 Tons.	Pig Iron	659,416 Tons
Coke	33,064 "	Coke	54,332 "
	618,938 "		713,748 "

Shipments in 1896 from 48 different furnaces. Sales in every state east of the Mississippi and north of the Ohio, and in most southern and western states. Twenty-two salesman.
Nine headquarters.

The World's Greatest Pig Iron Business

BUILT UP IN 16 YEARS.
WHAT BUILT IT?

Energy, Intelligence,
Fair and Honorable Dealing.



Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

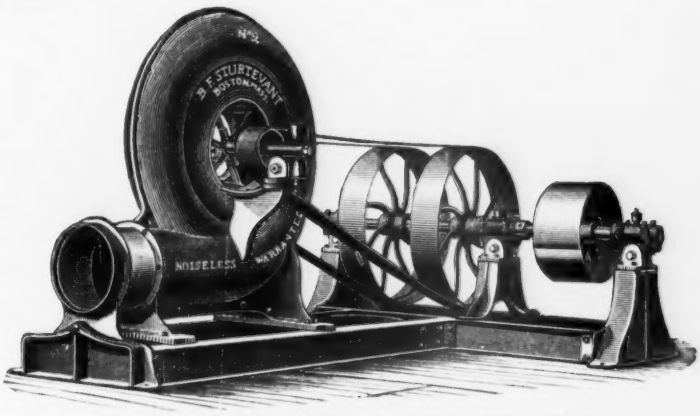
—FOR—

Cupola Furnaces and Forge Fires.

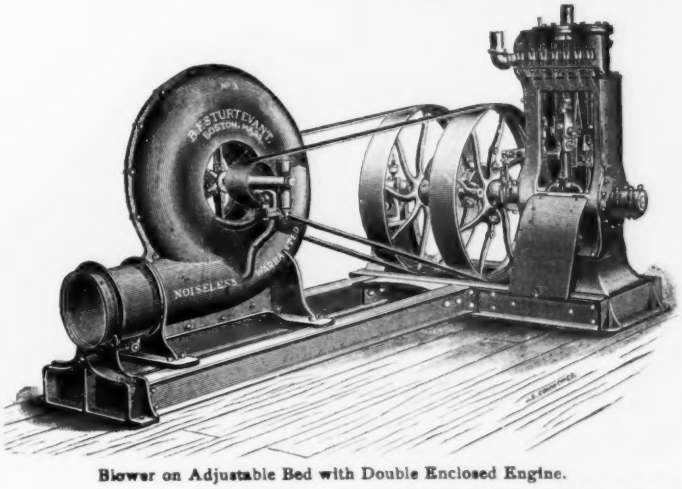
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors

Send for Catalogue.

B. F. STURTEVANT CO.,

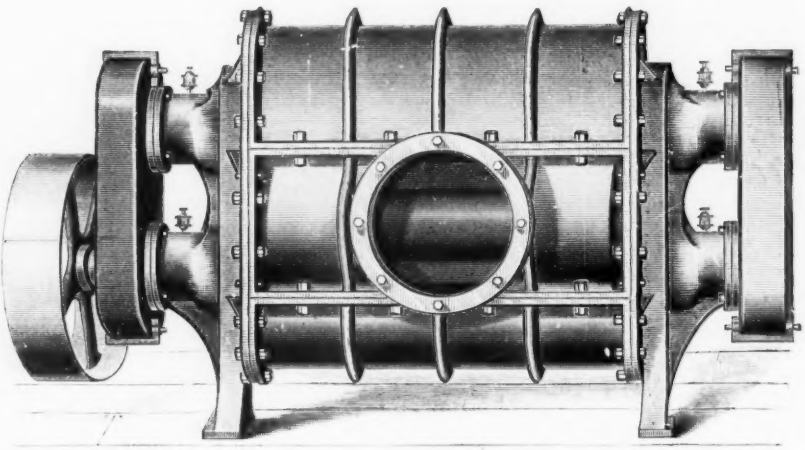
BOSTON, MASS.

131 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

STOCK CARRIED AT BRANCHES.

The Green Rotary Pressure Blower

GIVES THE MOST AIR FOR A $.



Working parts are two perfectly balanced impellers, mounted on the best steel shafts, running in bronze bushes, cut gearing at both ends of the Blower enclosed in oil-tight casing.

Weighs less, occupies less space, costs less for freight than any other POSITIVE BLOWER in existance.

GIVES THE MOST AIR FOR A $.

SEND FOR CATALOGUE.

Wilbraham Baker Blower Co.,

2518 Frankford Ave., PHILADELPHIA, PA.

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On Pittsburgh & Lake Erie Railroad
GENERAL OFFICE
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WASHINGTON COAL & COKE CO.

CAPITAL PAID UP $250,000.00

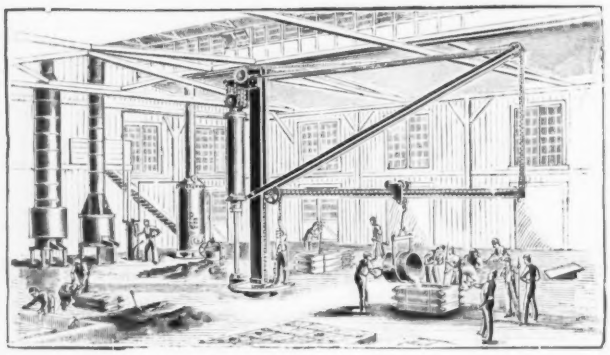
Youghiogheny Coal · High Grade Coke

INDIVIDUAL CARS.

DAWSON, PA.

N. P. HYNDMAN, Sales Agent
PITTSBURG, PA.

"A HINT IS AS GOOD AS A KICK"



5-ton Steam-Hydraulic Crane in a Foundry.

"Ridgway, will your cranes and elevators work just as well with Compressed Air as they do with steam?"

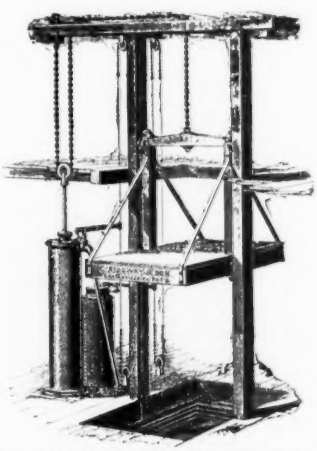
Why, to be sure they will.

We make lots of them to be run by air, but we rig them so steam and air may be used at pleasure. We do this, so if the air compressor gets balky and a kicking up just when a big ladle of melted iron has to be handled—and for some unexplained reason, an air compressor almost always chooses the middle of a big heat to go wrong—all you have to do is to turn a cock and the Ridgway crane goes right along by steam power just the same as by air power. This makes it very nice. Eggs in two baskets.

The only difference between running our cranes and elevators by steam or air power is that the steam is a good deal the cheapest and so long as the boiler don't blow up, you are always ready for business. When the boiler takes a notion to go out through the roof, you won't need a crane to lift things.

So, because we don't sing Air Cranes, you must not think you can't use air if you prefer it. Lots of our customers unite the steam and air as above. The thing is just this: Any machine that goes by steam can go quite as well by air, but the machine that goes by air cannot go by steam always, because the steam will ruin the air packing.

We make a complete line of air cranes; in fact, all the air lifts made are copied from our designs. We were the pioneers in this line of business and own valuable patents. We were the first to use steam and air in cylinders for direct lifting. Our celebrated Steam-Hydraulic system, now so popular, grew out of our wide experience in this work. If you have occasion to use such machineny, you should confer with us and not only get the best, but escape infringement suits which are surely coming.

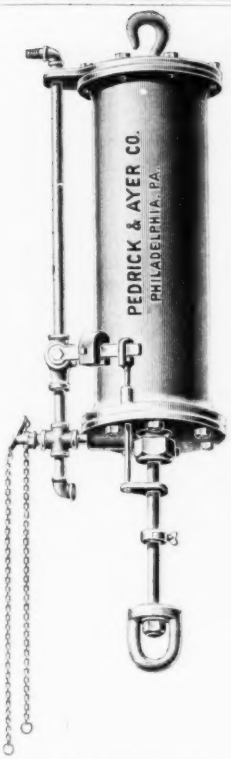


Steam-Hydraulic Elevator, also made direct acting with cylinder under platform.

"PLEASE TAKE THE ELEVATOR."

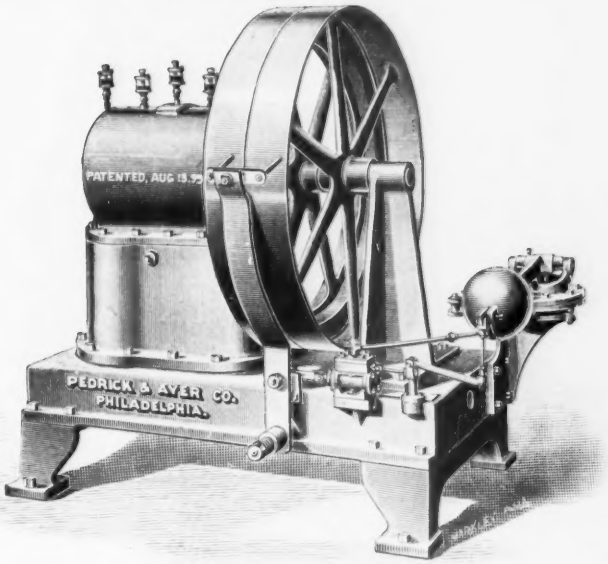
The machine that handles ladles of melted iron has all the qualities for a perfect elevator, eh?

CRAIG RIDGWAY & SON, COATESVILLE, PA.



Automatic Compound Belt Air Compressors.

PATENTED AUGUST 13TH 1895.



Straight Lift Hoist.

Built in two sizes, Nos. 1 and 2.

No.	Size of Cylinders in inches	Revolutions per Minute.	Cubic Feet of Free Air	Horse Power Required.	Size of Pulleys in inches	Shipping Weight of Compressor	Floor Space in inches	Telegraphic Symbol
1	11x 6 6x 6	100-160	32- 50	2-3½	40x5	2875 lbs.	60x40	Parian
2	13x10 8x10	90-120	90-120	9-15	60x6	5370 lbs.	70x60	Parish

HORIZONTAL HOIST.

PAT. SEPT. 4TH 1894.

AIR HOSE COUPLING

For ½ inch, ¾ inch and 1 inch Hose.

These Compressors will compress more air at less cost than any other make, requiring no attention other than oiling; entirely automatic in action, stopping and starting as air is required. Specially adapted for foundry use. Can be run in series, if so, no stoppage impossible.

Horizontal Air Lift for low ceilings; for general lifting, quick in action and under perfect control of operator.

Straight Air Lift for foundry purposes when equipped with retaining and releasing valve, will hold the load whether heavy or light, in the desired position, as in case of lifting a ladle of molten iron and pouring it or raising a flask to knock out the sand. It can neither ascend or decend as long as connected to air supply.

Air Hose Couplings are designed to do away with long lines of hose. By having suspended along the air line a number of hose equipped with this device, connections can instantly be made or disconnected, allowing one hoist to serve in several places. Each size made in duplicate. Containing a shut-off valve.

Send for circulars and details to Pedrick & Ayer Co., Pneumatic Department.

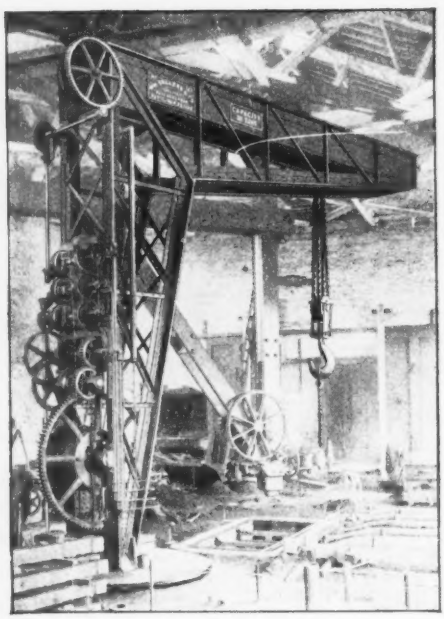
PEDRICK & AYER CO.

SPRING GARDEN STATION, PHILADELPHIA, PA.

William Sellers & Co. Incorp.

PHILADELPHIA.

MODERN FOUNDRY MACHINERY



In connection with our Machine Tool Business, we conduct a large foundry where practical tests are continually made of new labor-saving devices. The manufacture of

IMPROVED FOUNDRY CRANES

has become an important feature.

The accompanying illustration shows a quick-acting 30-ton Steam Jib-Crane, erected in the foundry of J. Morton Poole Co., Wilmington, Del., superceding old wooden cranes, one of which appears in the background.

This crane is driven by independent 8" x 8" engines. The platform levers are near the floor. The effective radius of hook is 23 feet.

In future issues of this magazine, we will show illustrations of Jib and Traveling Cranes operated by electric motors.

Centrifugal Sand Mixer

Since the introduction and favorable reception of this effective, expeditious and economical **machine for preparing sand for molds and cores** we have simplified its construction and cheapened its cost. The capacity of the machine is remarkable, being limited only by the facilities for feeding sand into the hopper. Two men will easily shovel 5 tons an hour into the machine.

The qualities of "toughness" and "porosity" are materially improved by this process of preparing molding sand.

TRANSLUCENT FABRIC SKYLIGHTS

ARE ESPECIALLY ADAPTED FOR

FOUNDRIES

In these buildings, Skylights are subjected to the severest conditions such as extremes of heat and cold, expansion and contraction, storms, etc. Under such conditions

GLASS IS VERY UNSATISFACTORY

as it breaks, the skylights leak and require constant repairing.

Translucent Fabric is Unbreakable!

And guaranteed proof against all these conditions.

The above cut shows Translucent Fabric Skylights having a superficial area of over 12,000 square feet.

OUR SKYLIGHTS are now used extensively throughout the U. S. and Canada with universal satisfaction. Catalogue, Testimonials, and Samples on application.

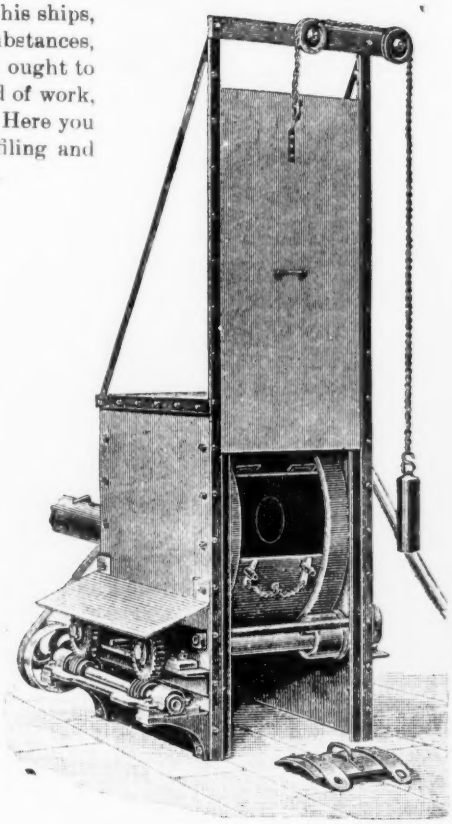
Translucent Fabric Co. Quincy, Mass.

SOLE MANUFACTURERS OF . . **TRANSLUCENT FABRIC.**
AND BUILDERS OF
TRANSLUCENT FABRIC SKYLIGHTS

Uncle Sam Knows a Good Thing!

When he sees it. He is using our machines to clean his ships, before painting, of all accumulations of foreign substances, which they contract by service on the ocean. This ought to be a good recommendation. If they will do this kind of work, what a snap they will have to clean your castings. Here you are worrying along, scratching, rubbing, grinding, filing and brushing, kicking at the molders and everybody else.

We can put you on to something better—something that will make you laugh and grow fat. When Saturday night comes around, you won't be in debt for wire brushes, and, confidentially, the men you have been in the habit of paying for moving the brushes will be absent too.



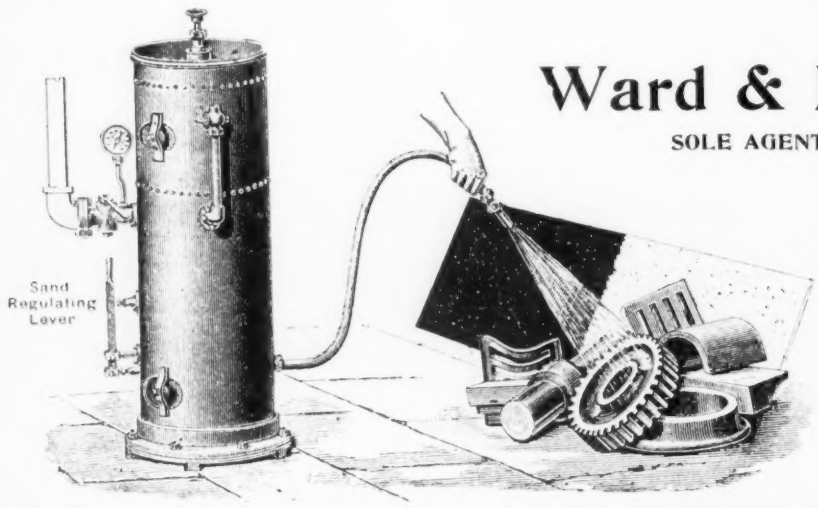
That means money in your pocket

There is nothing like our

Improved Sand Blast Machinery

Tilghman's Patents. Mathewson's Patents.

For cleaning any kind of iron work. The low cost at which it is operated can not be conceived until it is seen in operation. We will tell you more about it if you will favor us with your address.



Ward & Nash,

SOLE AGENTS,

23-25
Purchase
Street
BOSTON

35-37
South Canal
Street
CHICAGO

SAMBO. TOPSY. PERSIMMONS.

Sambo Lehigh—"Whar be yo gwine, Topsy?"

Topsy Sea Coal—"I's gwine up to Detroit, I is."

Persimmons Mineral—"What fo yo gwine up dar?"

Topsy Sea Coal—"I's gwine to see dem Foundrymen, I is."

Sambo Lehigh—"Right yo am, ma honey?"

Persimmons—"Who am dose Foundrymen?"

Topsy Sea Coal—"Why they am de fellers what runs dat big Foundry Convention up dar. All de folks will be dar; you better jine de gang and go with me."

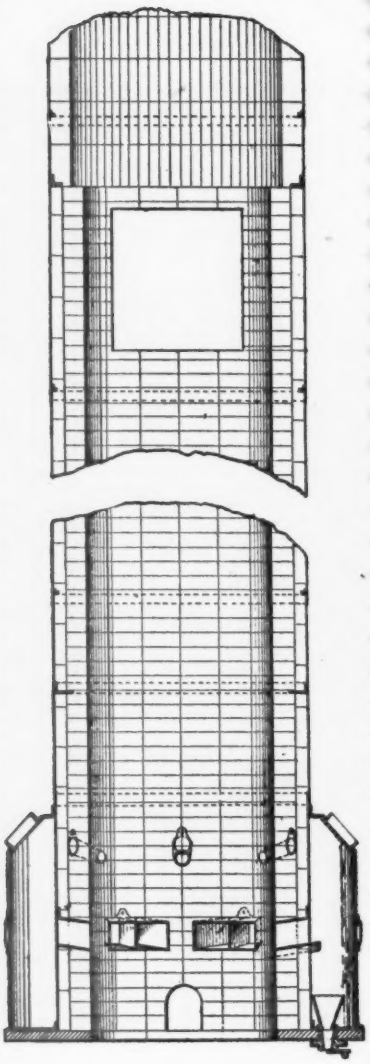
Chorus—"We'll be dar sho' nuf."

"Three Little Pickaninnies."

J. W. PAXSON CO.

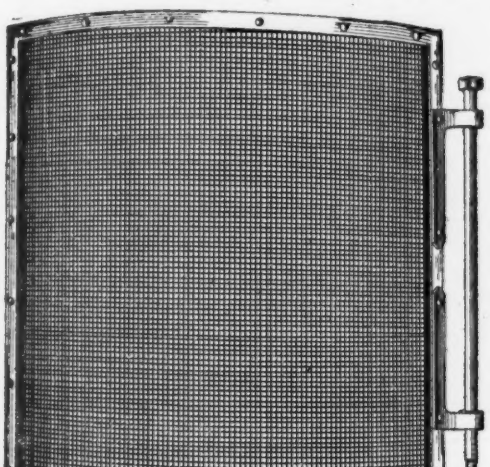
PIER 45 NORTH, PHILADELPHIA, PA.

Manufacturers ▪ Foundry ▪ Equipment.



The Standard Cupola

Which we claim will melt more good hot iron for less money than any other. Please notice the new Safety Tuyere and Trap . . . . . .



Cut of NEW SCREEN CHARGING DOOR used on this Cupola

We supply Cupola, Lining and Blast Metre all complete

It will be better for you to think About this matter the way we want you to!

OF COURSE, you will say: "Here is that man Ayers tooting his own horn again." But, now, neighbor, could we have tooted it for nearly fifteen years without having been of some service and benefit to the foundry trade at large? NIT! We have rendered full value for every dollar that has been turned over to us, and

We are prepared to do it again!

WHEN Your molders have drop-outs - - -
Castings are rough -
You find the sand cutting - - - -
Or a swell - - -
Everything fails -

YOU SAY Put more gaggers in. ——— the facing.
Ram softer.
Ram harder.
Dry the molds.

THOSE ANSWERS ARE NOT RIGHT.

You are instituting economy at the wrong end. A good molding sand would do away with most of your troubles. There are more dirty castings caused by using a poor sand than by dirty iron. The difference in price is small; why not get the best?

If every man Attended to his Own business

He would get along better. We attend to ours. We make it a business to see that you get what you need. All sands subjected to our own personal supervision. If you want to see what we have got, just let us know and tell us what kind of work you want it for. We can send you any grade of **Molding Sand** you may require, from the finest to the coarsest, and guarantee quality always the same. Our No. 1 Sand has no superior that we know of for Stove Plate, Hollow Ware, Grey Iron and Malleable Castings; our No. 4 is the best Sand in use for Heavy Castings of any kind. It is an extra good wearer and is always sure to turn out a perfect casting. Our Crude Plastic Fire Clay is very refractory and guaranteed to work plastic readily in water.

ZANESVILLE SAND HAS A REPUTATION . . .

If you try us once, we will have you with us forever.

E. M. AYERS ✲ MARKET BLOCK ZANESVILLE, OHIO.

"Plain Talk with Foundrymen."

ENTIRELY NEW!

No work of this nature has ever before appeared in print.

A Complete Malleable Iron Treatise :

PRESENTING the latest up-to-date methods for the treatment of **Malleable Iron** in all its transitory stages, from the **raw material** to the **finished product**, including in its scope, **accurate analyses** for different mixtures, **detailed description of the construction and operation of the air furnace and annealing oven**, ordinary cupola practice, the grading and charging of pig iron and steel scrap, **brass and bronze mixtures and aluminum alloys**, giving a plain, reliable statement for instruction in malleable practice. Heretofore no condensed publication devoted to malleable casting has appeared. This book is replete with **UNWRITTEN TRADE SECRETS** so jealously guarded in the past, and of priceless value in mixing and annealing. It is a veritable encyclopedia, a rare gem. No foundryman can afford to be without it. It is available to employe as well as employer, and fairly glitters with analyses, tables, receipts and other valuable information for overcoming difficulties always encountered in malleable and gray iron founding.

Sent postpaid to any part of the United States or Canada, upon the receipt of $2.50.

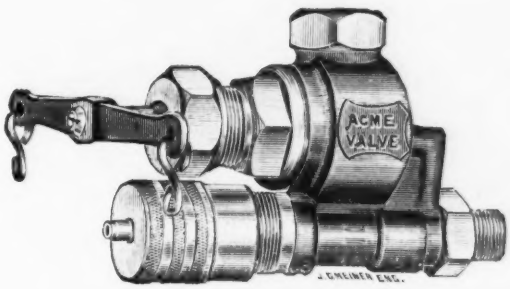
ADDRESS J. F. BOYNTON & CO., MOLINE, ILL.

THE ACME HOIST CO.

MAKE

AIR HOISTS

of any capacity from 500 lbs. to 5 tons, equipping them with the



ACME VALVE

WHICH permits the speed of lifting to be regulated. This Valve is most . . . . . .

Economical in the Use of Air

since only the requisite quantity to lift the required load, whether light or heavy, is used. This, in connection with the **automatic shut-off and load-retaining valve,** prevents the cylinder from becoming a reservoir of compressed air that must be wasted by exhausting into the atmosphere before the hoist can be used.

Address communications regarding Hoists or Valves to

The Acme Hoist Co

69 MAYBURY AVENUE,

Detroit, Mich.

NO ONE KNOWS

How much Money

Real hard coin of the realm . . . . . .

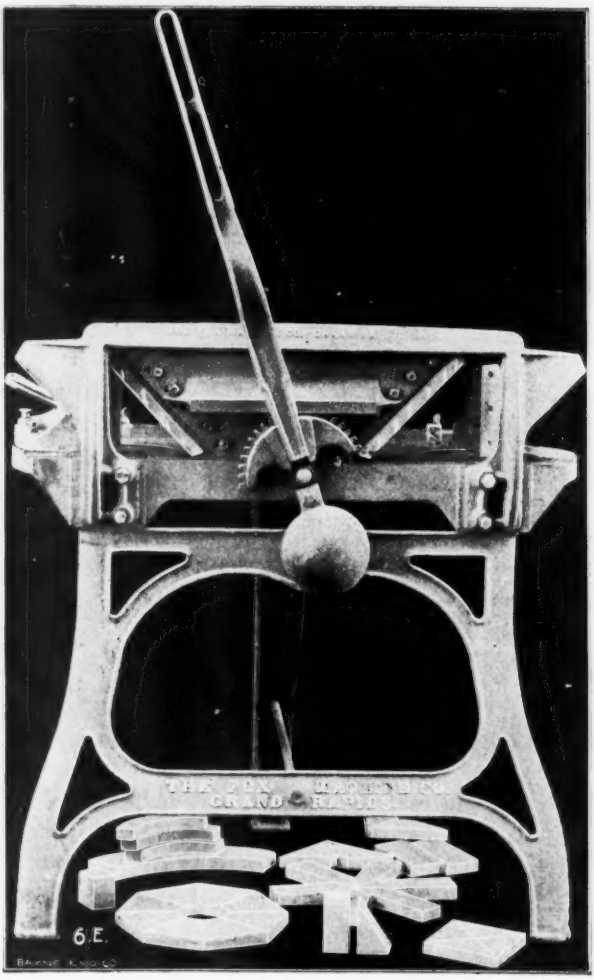
The Fox Universal Trimmer

will save, unless he has used them . . . . .

Not a useless Toy or idle Ornament

in the pattern room, . . but a real business-built machine for practical mechanics . . .

Sent on trial to Responsible People



Inquiries Welcome. Catalogue Free.

FOX MACHINE CO.

850 N. Front Street, GRAND RAPIDS, MICH.

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

15 Beekman Street, NEW YORK

Boston Office, 85 Water Street

F. A. GOODRICH & CO.

Incorporated

PIG IRON, STEEL, COKE, ETC.

Detroit, Mich.

MATTHEW ADDY & CO.

CINCINNATI, ST. LOUIS.

Agencies.

Chicago, Detroit, New York,

Philadelphia.

PICKANDS, BROWN & CO.,

Manufacturers, Importers
and Dealers in

PIG IRON AND IRON ORE.

Rookery Building, CHICAGO.

THE DOMHOFF & JOYCE CO.

PIG IRON-COKE.

CINCINNATI.

CLINTON IRON & STEEL CO.

Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

PITTSBURG, PA

15 Cortlandt St., NEW YORK.

ROGERS, BROWN & CO.

CINCINNATI, CHICAGO,

BUFFALO,

PHILADELPHIA, NEW YORK,

ST. LOUIS

Over 10,000 in Use.

ALWAYS READY!

800 TO 2000 CANDLE POWER.

ESPECIALLY ADAPTED FOR

FOUNDRIES

PORTABLE, SELF-CONTAINED, AUTOMATIC.

NO SMOKE! NO SPRAY! NO SHARP SHADOWS!

Now in Valuable Use With Hundreds of Foundries

In addition to 400 Railroads and over 300 Contractors.

REQUEST CIRCULARS FROM

THE WELLS LIGHT M'F'G. CO.

EDWARD ROBINSON, Sole Proprietor.

44-46 WASHINGTON STREET, NEW YORK.

ROSS-MEEHAN FOUNDRY CO.
CHATTANOOGA, TENN., May 5, '96.

The Wells Light M'f'g. Co., Nos. 44 and 46 Washington St., New York City:

GENTLEMEN—It is contrary to our rule to give testimonials, but an article with the merit of your Wells Light deserves to be made an exception. We have used your lights for the past five years, and consider them indispensible to us.

Yours very truly,
ROSS-MEEHAN FOUNDRY CO.
P. A. BRAWNER, JR., Sec'y. & Treas.

UNIVERSAL TRIMMING MACHINE.

It is Little Things ✻ ✻ That Count

From the time the raw material enters the shop until it goes out—a finished product—to make you a reputation, it is a little here and a little there that makes your profit. So much is being said about economy in the foundry, why not in the pattern shop? A dollar saved there ought to be worth just as much as if it came from the foundry. Our Trimmer is made to save money. See our exhibit at the Convention, where we will explain their good points, or write us and we will tell you all about them.

OUR MACHINE HAS ALL OF THE GOOD POINTS AND NONE OF THE BAD ONES.

Leland & Faulconer Mfg. Co. ✻ DETROIT, MICH.

The Edw. P. Allis Co.

Milwaukee, Wis. have the largest foundry (exclusively for machinery castings,) in the United States. Its interior is shown by the following cut. . . . .

The daily melt is from 60 to 90 tons. All the heavy work is done under and handled by **THREE** thirty ton

Shaw Electric Traveling Cranes,

The first of which was put in operation in 1889, the second in 1891 and the third in 1893. Besides these, there are three more Shaw Cranes in the erecting and machine shops.

These Crane are Made Only by

THE SHAW ELECTRIC CRANE CO.

MUSKEGON, MICH.

——And Sold Only by——

Manning, Maxwell & Moore,

424 TELEPHONE BUILDING, PITTSBURG.

60 S. CANAL ST., CHICAGO, ILL. **111 LIBERTY ST., NEW YORK.**

The United States Government

AND EVERY OTHER Government, firm or corporation, when buying castings requiring great strength or wearing powers, require that a certain percentage of charcoal iron shall be used in the mixture. In order to reduce cost of handling, facilitate prompt shipment, secure uniform product, and furnish the best grade of iron for any special purpose at the lowest possible price, the **Superior Charcoal Iron Company** have secured the exclusive sale of the various charcoal irons noted in this advertisement on other page. Here we will be pleased to see our friends and from this point make prompt quotations. We are confident that the demand for greater excellence and wearing qualities, coupled with a more general knowledge of the value of charcoal iron must eventually result in its more general use. A few cents a ton to the manufacturer may mean hundreds, yes, thousands of dollars to the user, save a broken wheel or worn out piece of machinery at a critical moment. We are constantly in receipt of inquiries as to the best iron for certain work. It is a pleasure to answer letters and it is possible we may be able to render you valuable service. If in Detroit call and see us, if not, write for prices on iron that will make castings requiring no defending or excusing.

The Superior Charcoal Iron Co.

Newberry Building, Detroit, Mich.

The Superior Charcoal Iron Company

Exclusive Dealers in the Following Well-Known Brands of . . .

ANTRIM,
GAYLORD,
PIONEER,
UNION,
ELK RAPIDS,
HINKLE,
PENINSULAR,
SPRING LAKE.

Lake Superior Charcoal Pig Iron

ALL BUSINESS connected with the sale of the above brands of Charcoal Pig Iron will, from April 1st, '97, be handled by **The Superior Charcoal Iron Company**, of Detroit, Mich., which is thus enabled to supply the best iron known for all purposes, and especially for Car Wheels, Malleable Castings, Boiler Tubes, Ship and Armor Plate, Strong High Silicon for Foundry Purposes, Basic Iron with the minimum of Silicon and Sulphur.

Officers

WM. G. MATHER, President.
W. H. HINKLE, Vice-Pres.
F. B. GAYLORD, Sec'y and Treas.
J. C. HOLT,
WM. GERHAUSER,
Sales Managers.

OFFICE—66 Newberry Building,

DETROIT, MICH.

Good Castings

Are made by some people all the time—others make them sometimes, but never with poor coke . . . . . .
All other things being right . . . .

Powellton Foundry Coke

Is Guaranteed to make Good Castings . . . **All the Time!**

Physically equal and chemically superior to any other coke made. We claim, without fear of contradiction, that no other so nearly approaches the ideal coke for foundry purposes.

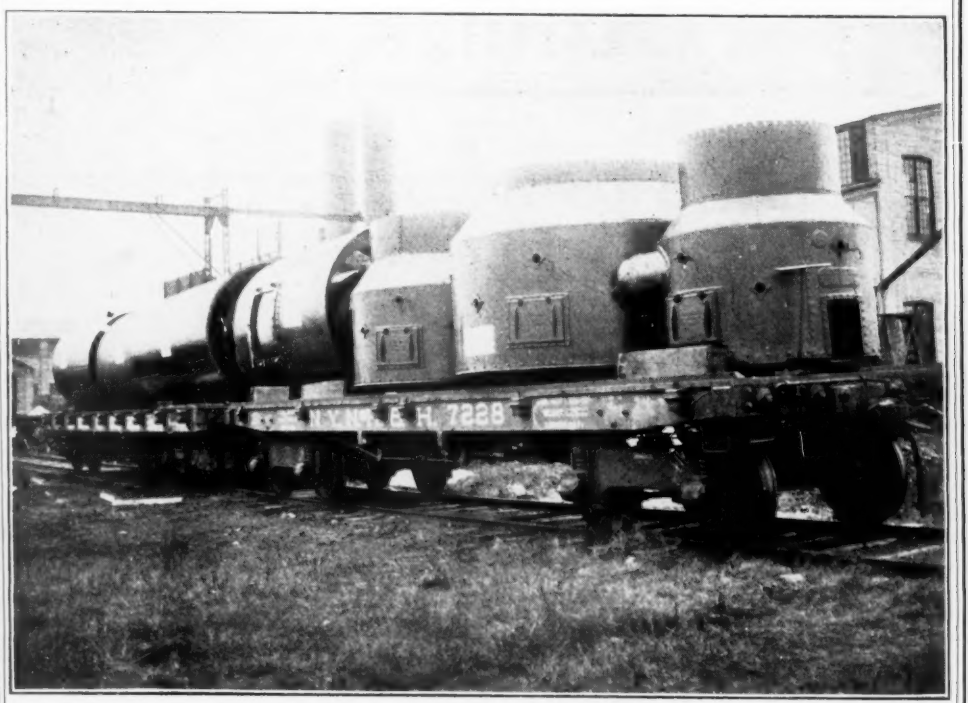
Pure and Uniform.
High in Carbon.
Low in Sulphur and Ash.

AND the price—we don't sell as cheap as some people—but we aim to make the prices like the coke—all right . . . .

We will have more to say in the next issue. In the meantime drop us a postal card for physical and chemical tests and prices. References, too, if you want them . . .

The Mount Carbon Company, Ltd.

POWELLTON, WEST VIRGINIA.

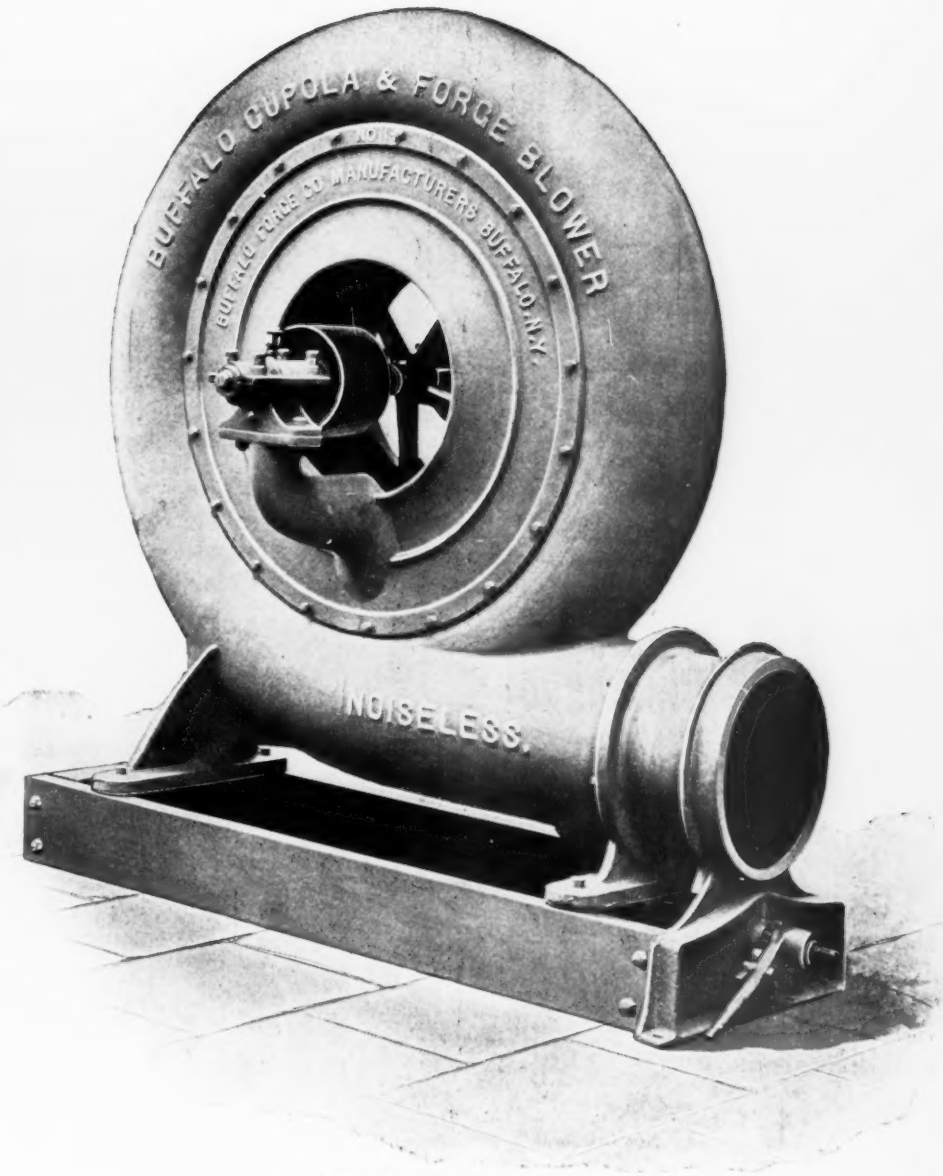


WHITING CUPOLAS

purchased by the U. S. Government for the new navy yard foundry at Washington, D. C. The "Whiting" is becoming generally recognized as the standard cupola for all classes of foundry work. Over three hundred in use in this country and others in Russia, Germany, Spain, Mexico, Cuba and other foreign countries. Our catalogue tells about it. We make also, Cranes, Ladles, Tumblers, Air Hoists, etc. Write us.

Whiting Foundry Equipment Co.

ADDRESS: WORKS, HARVEY, ILL. (CHICAGO SUBURB.)

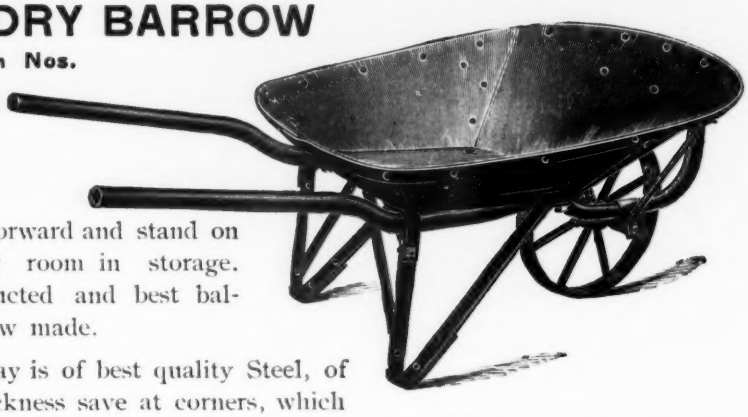


A BUFFALO BLOWER—ENOUGH SAID.

"SYRACUSE" Steel Wheelbarrows

FOUNDRY BARROW

Ten Nos.



All dump forward and stand on end, saving room in storage. Best constructed and best balanced Barrow made.

The Tray is of best quality Steel, of uniform thickness save at corners, which are of double thickness, being smoothly lapped and riveted. The edges are rolled over a band of steel riveted under the flange. The Legs have renewable Steel Shoes. Patent Steel Wheel with Staggered Spokes. Heavily braced throughout. The most durable and easily handled Barrow made. Steel Charging and other Barrows in variety. Send for handsome Illustrated Barrow and Truck Catalogue No. 6

SYRACUSE CHILLED PLOW CO., Syracuse, N. Y.

Crucibles AND Plumbago

Progress is the order of the day and our improvements have been so marked that we have attained as high as 90 heats, as per testimonial attached.

New Orleans, La., Feb. 13, 1896.

HUSSMAN CRUCIBLE CO., St. Louis, Mo.:

Dear Sirs—Kindly send me four (4) No. 70 and four (4) No. 80 Crucibles. I think I have established a record for Plumbago Crucibles. I took out an even 90 heats from one of your No. 70 Pots. Trusting you will give this order your immediate attention, I am,

Very truly yours,

F. H. KORETKE,

922 Magazine Street, New Orleans, La.

CEYLON PLUMBAGO is the best for Facings, Lubricant, etc., and our prices the lowest.

Hussman Crucible Co.

ST. LOUIS, MO.

Eberhardt's Patented Sprue or Gate Cutter

Dear Sir: The machine fills the bill; am just delighted with it.

Yours truly,
Maryland Brass & Metal Works,
Baltimore, Md.

Price Low

Send to

GOULD & EBERHARDT, NEWARK, N. J.

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.75 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month, $20.00
Half page - - -	" 12.00
Quarter page - -	" 7.00

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements must be in by the 20th of the month preceding publication to insure insertion.

The Coburn Patent Trolley Track

PARLOR DOOR HANGERS.

The adjustment is in the Track and not in the Hanger, as are others.

☞Send for Book.

The Coburn Patent Trolley Track

BARN DOOR HANGERS.

Impssible for door to jump the track. Very simple and cheap to apply.

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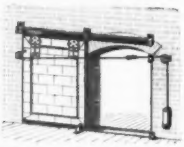
The Coburn Patent Trolley Track



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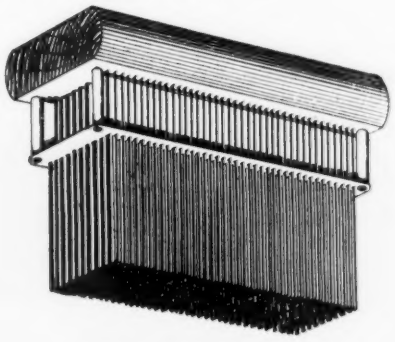

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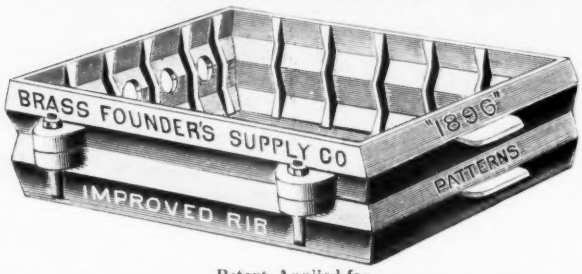

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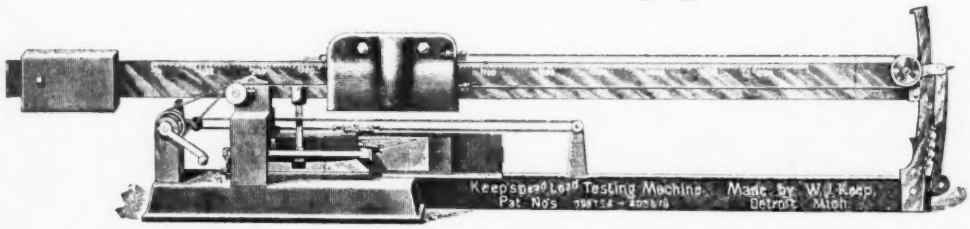

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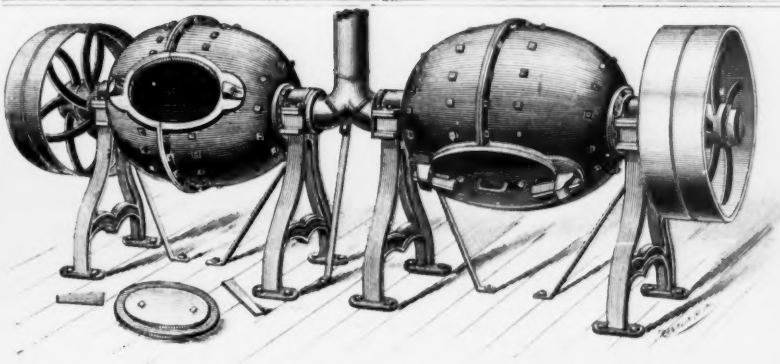

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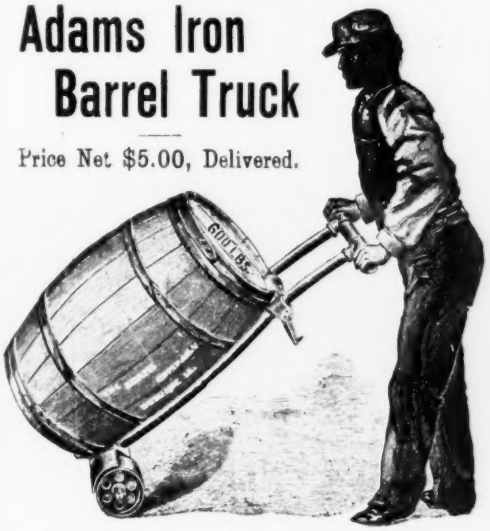

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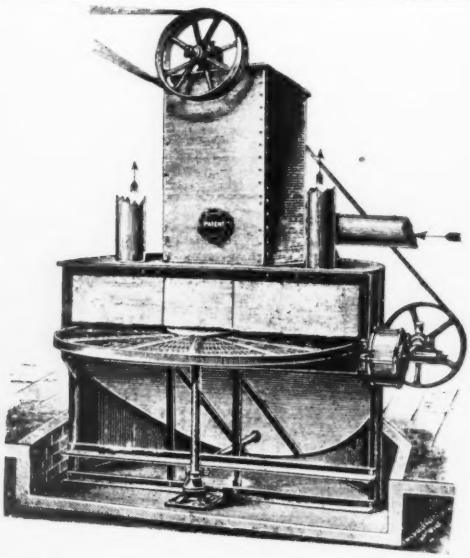

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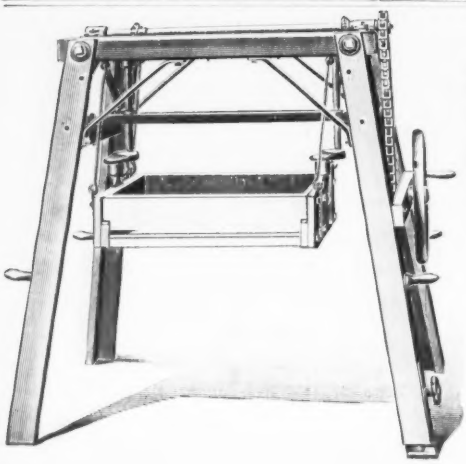

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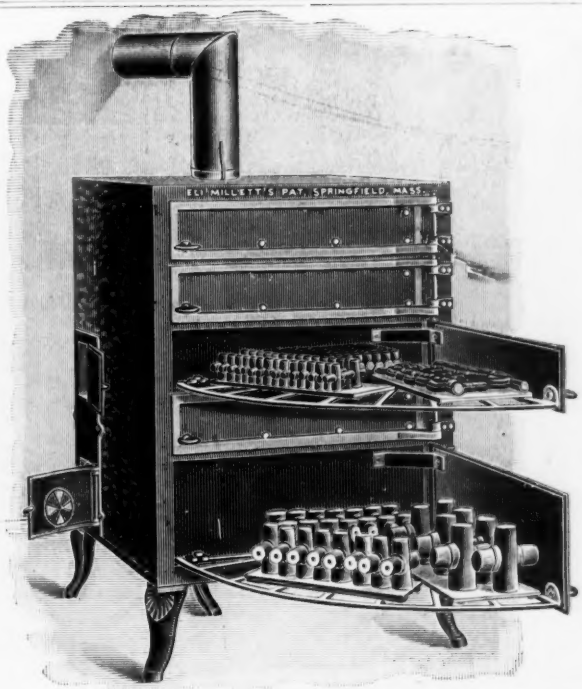

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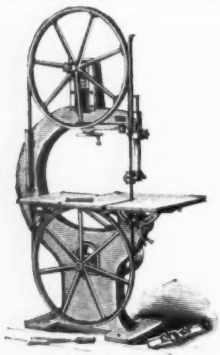

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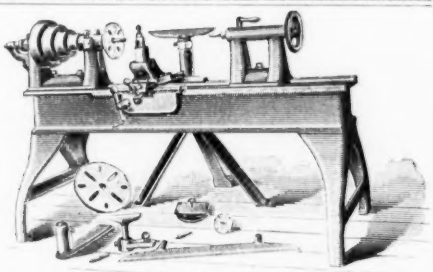

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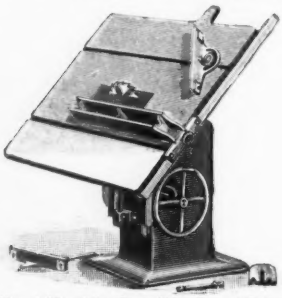

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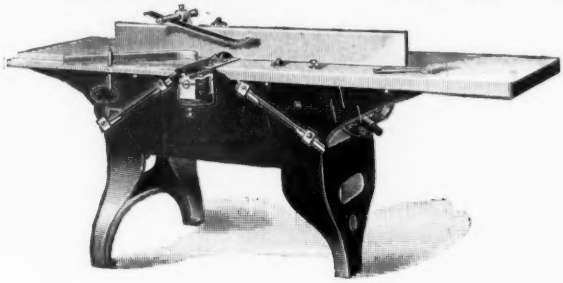

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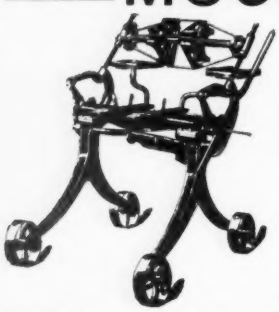

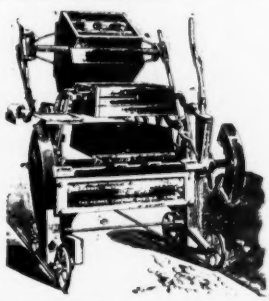

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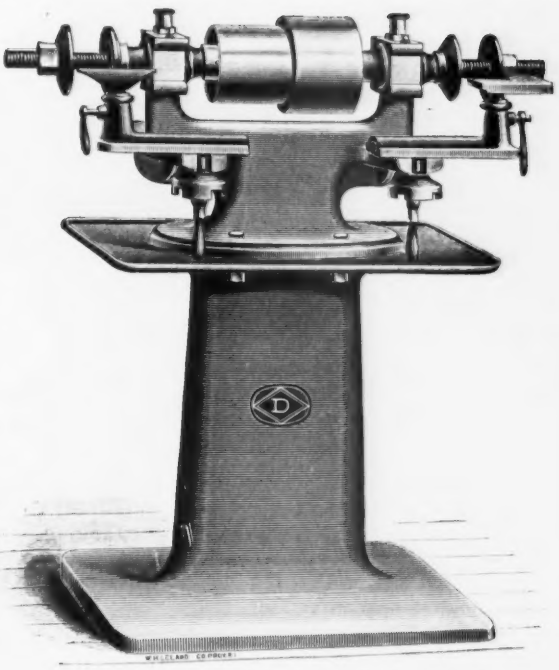

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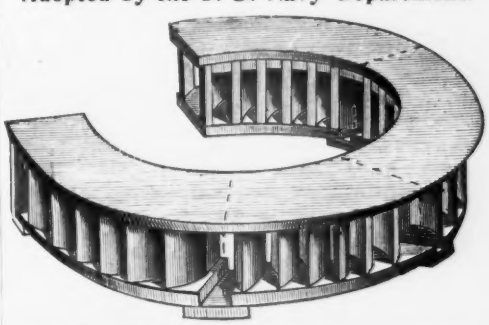

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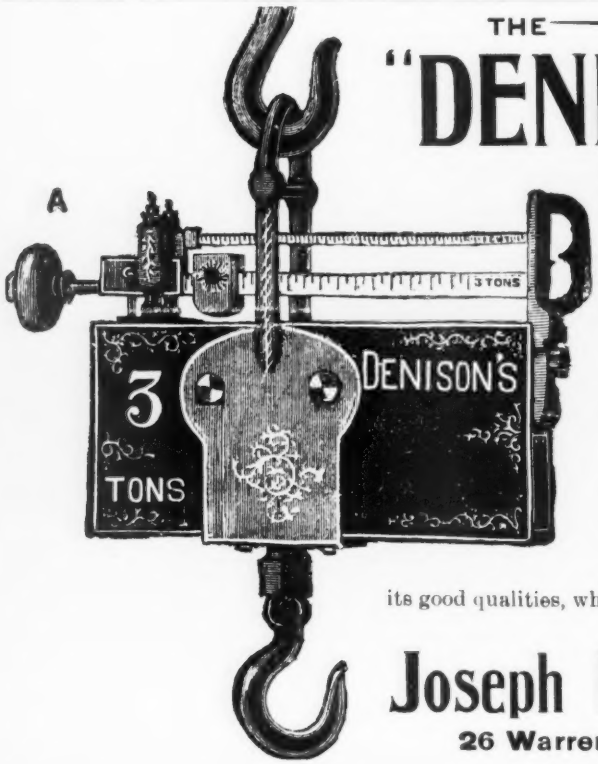

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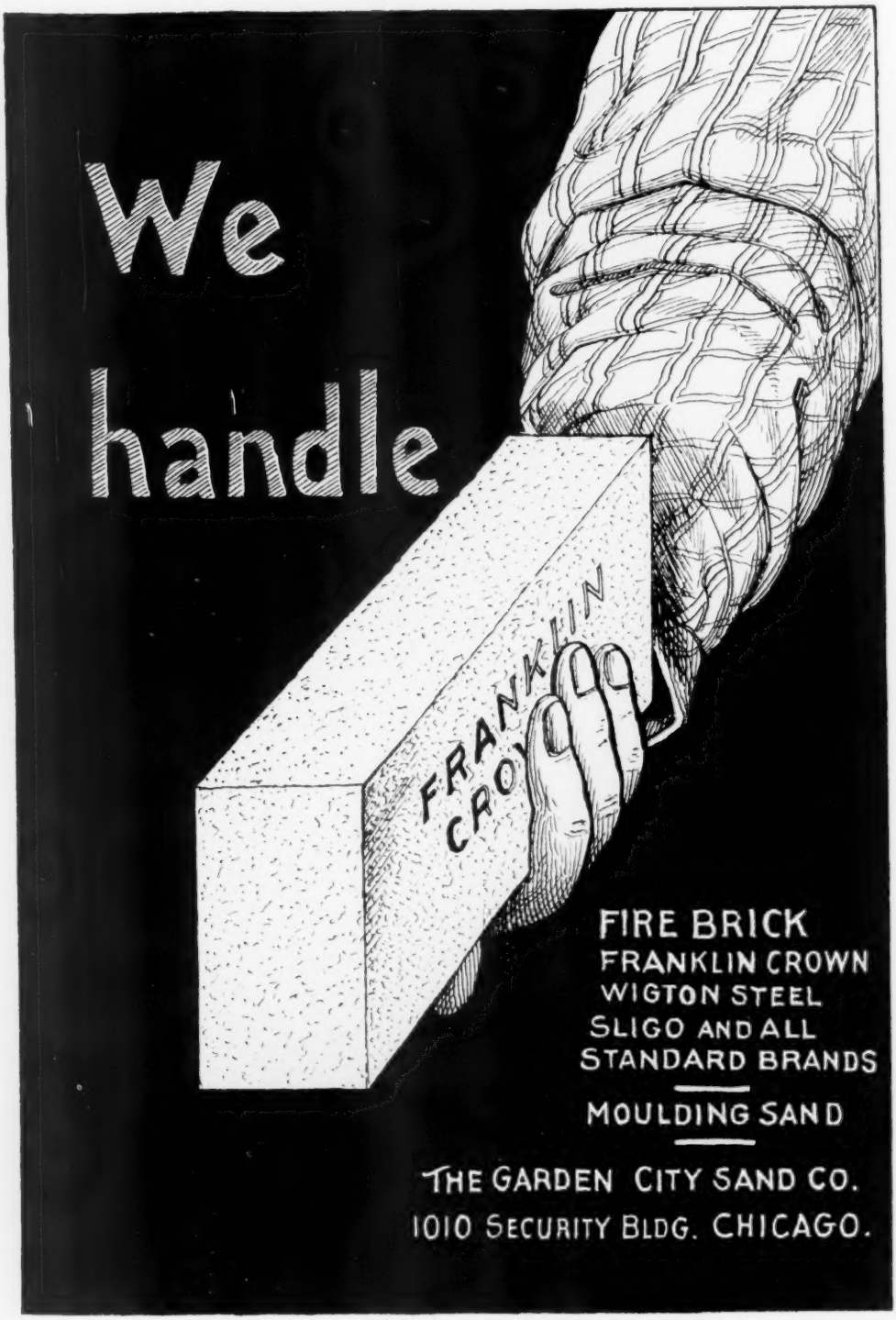
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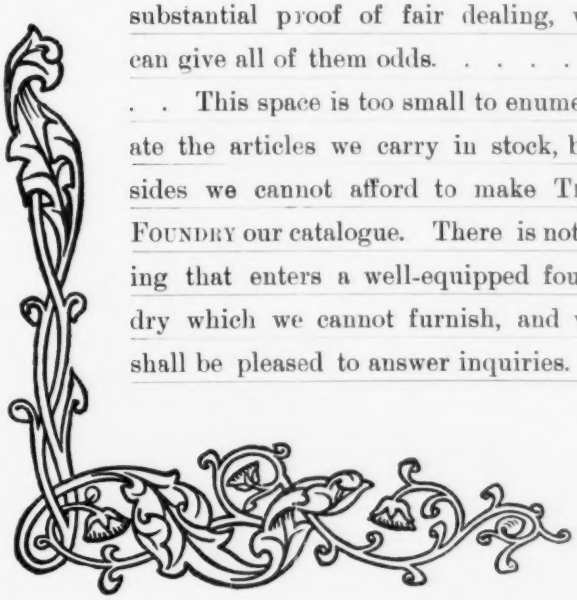
for manufacturing and distributing all kinds of foundry supplies is unequaled. That this advantage is shared by our patrons is proven by the increased number of foundrymen added to our own list of customers. We may not be as long-winded as some of our competitors, but when it comes to furnishing substantial proof of fair dealing, we can give all of them odds. . . . . This space is too small to enumerate the articles we carry in stock, besides we cannot afford to make THE FOUNDRY our catalogue. There is nothing that enters a well-equipped foundry which we cannot furnish, and we shall be pleased to answer inquiries. .



THE S. OBERMAYER CO

CINCINNATI, OHIO

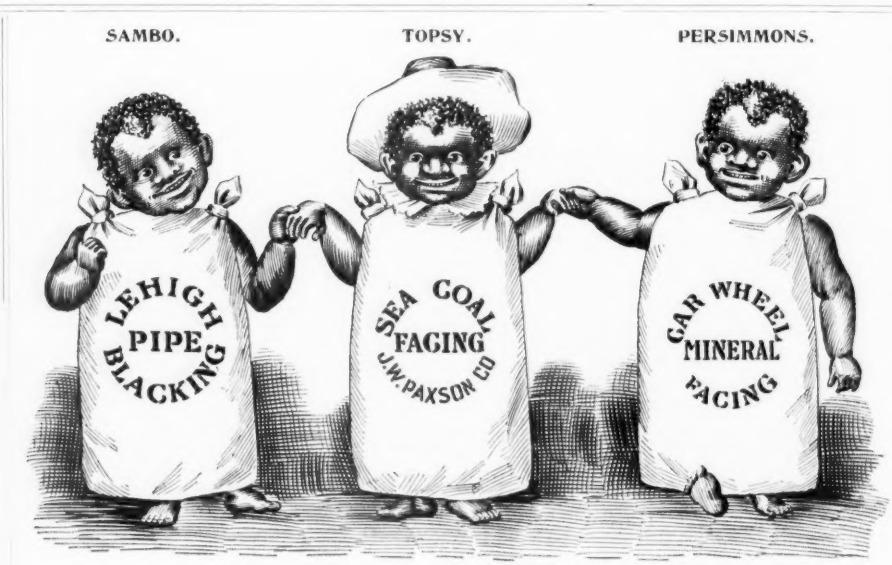
Factories at . . . . **Cincinnati, Ohio.**
Chicago, Ill.
Larimer, Pa.
White Haven, Pa.

J. W. PAXSON CO.

PHILADELPHIA, PA.

Quaker City Facing Mills

Our No. 1604 Plumbago Facing makes the Cleanest and Smoothest Castings in America. Try.



WHO'S DE BOSS?

TOPSY SEA-COAL—"Whar d'yo' cum frum, an' what yo' made fo', Sambo?"

SAMBO BLACKING—"I cums from up de Lehigh Regi'ns, whar de Black Dimon's shine, an' I helps make de big Pipe dat carries de water an' de gas all ober dis hy'ar country."

TOPSY—"Who be yo' fam'ly, Mistah Persimmons?"

PERSIMMONS MINERAL—"Why, I'se de boy what helps make de wheels dat carries de Cars all ober dis big land."

SAMBO and PERSIMMONS—"W'at yo' puttin' on so many airs 'bout, Miss Topsy."

TOPSY—"I want yo' gemens to understan' dat I's no common niggah. I's de Queen ob de May; I was born in de Paxson's Big Mill, an' I goes to all de foundries. I helps to make de big Locomotives w'at runs on dem wheels an' pulls dem Cars; an' de Machin'ry, tew, dat makes de big Pipes dat yo's talkin' 'bout; so yo' boys is'nt in it fo' a minnit wif me. I's de new coon in town, an' w'en yo' cums to Philadelphi' after de Convention look me up, an' I'll sho' yo' how I makes de cle'nest Castings yo' ebber can see in dis world."

YOU ONLY NEED

TO USE

LUMBERTON * SAND

AS A

FACING SAND.

(THAT'S WHY SO LITTLE OF IT GOES SO FAR.)

YOU CAN USE

"ANY OLD THING"

FOR YOUR

HEAPS.

YOU HAD BETTER
WRITE US ABOUT IT.

J. W. PAXSON CO.
PHILADELPHIA, PA.

A Word

as to

Joseph Dixon Invented the Plumbago Crucible

DATE OF INVENTION
1826.

Dixon's Crucibles have been in the Market SEVENTY YEARS.

Dixon's Plumbago Crucibles

Dixon's Crucibles are Standard all over the **GLOBE.**
Dixon's Crucibles are used in every country on the Globe where metals are melted.
Dixon's Crucibles have the highest records for **HEATS.**
Dixon's Crucibles are made to get

BEST RESULTS WITH THE LEAST COAL.

Dixon's Crucibles are made of many mixtures to suit all kinds of work.
Dixon's Crucibles are made special for Steel Melting.
Dixon's Crucibles are made special for Nickel Melting.
Dixon's Crucibles are made special for Brass Melting.
Dixon's Crucibles are made special for Composition Melting.
Dixon's Crucibles are made special for Phosphor Bronze Melting.
Dixon's Crucibles are made special for German Silver Melting.
Dixon's Crucibles are made special for the Melting of Precious Metals.

In ordering you will be benefitted by mentioning the kind of Metals melted. Write for pamphlet **"How to Use Plumbago Crucibles."** The best are the cheapest, as they must stand the punishment of high heat and much wear and tear. The "Dixon" records in average efficiency, in general good behaviour and in volume of sales, far in the lead.

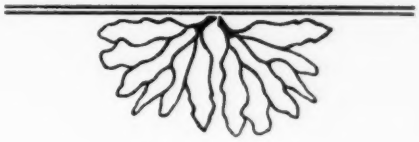
Jos. Dixon Crucible Company,

JERSEY CITY, N. J.

Whitehead Brothers Company,

DEALERS IN

Molding Sand



FIRE SAND,
PHILADELPHIA SAND
FRENCH SAND,
FIRE CLAY, KAOLIN,
FOUNDRY FACINGS
and SUPPLIES
OF ALL KINDS.
LEAD FACINGS
A SPECIALTY.

Albany Sand for Brass and Stove Plate Castings.

537=39 West 27th St.,
NEW YORK.

Providence Office,
42 S. Water Street.

Buffalo Office,
70 and 72 Columbia St.

WORKS AT

CHEESEQUAKE CREEK, N. J.
SOUTH RIVER, N. J.
RARITAN RIVER, N. J.
SOUTH AMBOY, N. J.
WAREHAM, MASS.
CENTRE ISLAND, L. I.
WATERFORD, N. Y.
ALBANY, N. Y.
CEDAR HILL, N. Y.
COXSACKIE, N. Y.
CLINTON POINT, N. Y.
ATHENS, N. Y.
COEYMANS, N. Y.
WILLOW SPRINGS, N. Y.
POUGHKEEPSIE, N. Y.
CRESCENT, N. Y.

Established 1872. Incorporated 1895.

McCullough-Dalzell Company

PITTSBURGH, PA.

CRUCIBLES for Brass Melting .

CRUCIBLES for Steel Melting .

CRUCIBLES for All Purposes . .

CRUCIBLES of All Sizes . . .

STOPPERS, Twenty-one Styles .

LIDS, COVERS, CAPS, . . .

PHOSPHORIZERS . . . .

PLUMBAGO FINE DUST . . .

ALL ARTICLES CONTAINING PLUMBAGO

Crucible.

ROBT. J. TAYLOR & SON

COR. 19th & CALLOWHILL ST. TRADE MARK. PHILA.

Crucible

Dipper.

Cover.

Stopper.

Crucibles

For melting Steel, Brass, Copper, Gold, Silver, Nickel and Metals and Alloys of Every Description; Small Crucibles for making Assays and fine pure Plumbago for lubricating, etc.

We are practical workmen and have studied the requirements of the different metal works in this country, as well as in Europe. We also work strictly by chemical analysis, giving a uniformity at all times never before approached in this or any other country.

We make All Sizes, from 8 oz. to 2 ton Capacity.

ROBT. J. TAYLOR & SON,

1900 to 1916 CALLOW HILL STREET, PHILADELPHIA, PA.

We Guarantee..

That one man with one of our **PNEUMATIC HAMMERS** can do more and better work than four men working in the ordinary way.

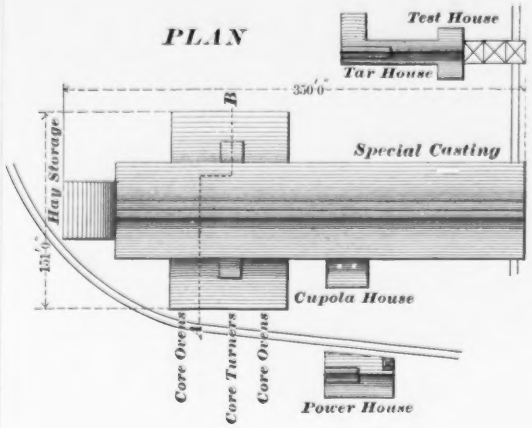
These same Hammers are also especially adapted for calking boilers and beading flues.

We also manufacture the best Air Drill on the market, and our Air Hoist and Compressors are especially designed for foundry work.

All tools sent on ten days' trial, subject to approval and are guaranteed for one year.

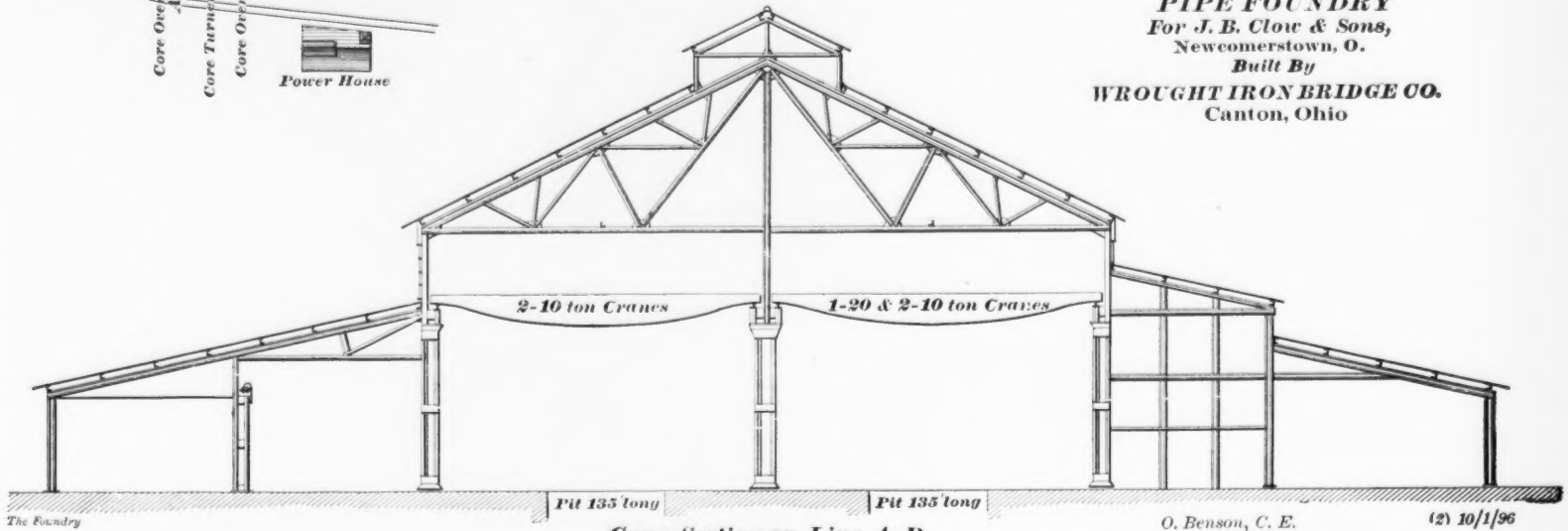
Chicago Pneumatic Tool Co.,

635 Monadnock Building, CHICAGO, ILL.



WROUGHT IRON BRIDGE CO.

PIPE FOUNDRY
For J. B. Clow & Sons,
Newcomerstown, O.
Built By
WROUGHT IRON BRIDGE CO.
Canton, Ohio



Cross Section on Line A-B

O. Benson, C. E.
Structural Engineer

(2) 10/1/96

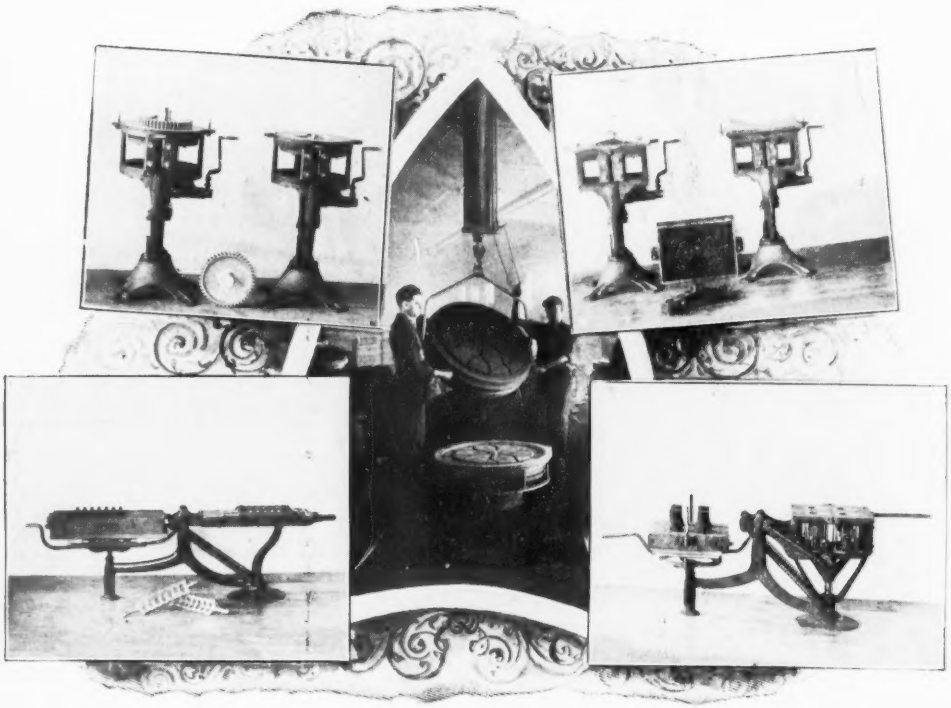
We design and construct Foundries, Machine Shops and similar structures. Also Roofs, Turntables and Bridges of every description.

Principal Office and Works at Canton, O.
Branch Offices at New York, Chicago, Indianapolis and Kansas City.

MOLDING MACHINES

FOR ALL CLASSES OF WORK.

STRAIGHT DRAW, ROCKOVER. AUTOMATIC DRAW ROCKOVER,
IN OVER TWENTY DIFFERENT SIZES.



Guaranteed to pay out in Six Months When run to their full capacity.

The Pridmore Molding Machines

INSURE BETTER AND MORE UNIFORM CASTINGS.
LESSEN COST OF MACHINE WORK ON CASTINGS.
LIGHTEN THE LABOR AND SIMPLIFY FOUNDRY METHODS.
SAVE FIFTY TO SEVENTY-FIVE PER CENT.

Those having Grey Iron or Brass Castings to make in reasonable quantities, will do well to write for full information and lists of many foundries now using these machines. Estimates, prices, terms, etc., will be promptly furnished. Rights to use these machines for Malleable Iron and Steel Castings are reserved. Address,

HENRY E. PRIDMORE,

111-113 W. Harrison St., CHICAGO, ILL., U. S. A.

CHAS. M. JARVIS, President. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

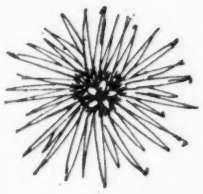
THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

Iron and Steel Bridges, Roofs and Buildings.

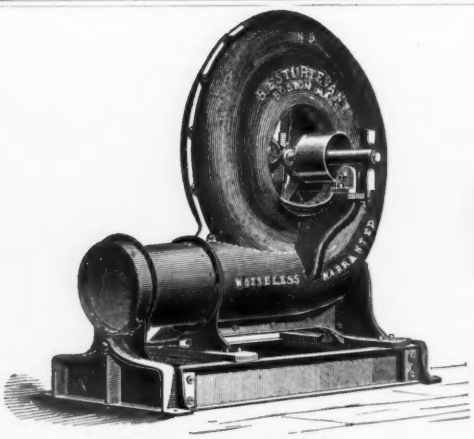
Foundry Roof for Sale



WIDTH of building, 155 feet out to out, divided into a center span of 66 feet, with a wing on each side 46 feet 6 inches in width. Total length of building, 350 feet. This roof was designed for an iron foundry, but owing to the failure of the purchaser, is now offered for sale at a bargain. The side walls and gables of the building are of brick, the roof trusses and columns only, being for sale. There is also with the foundry a cupola 57 inches in diameter, 80 feet high, made of $\frac{3}{8}$ inch boiler iron, complete with a No 8 Sturtevant Blower. Manufacturers contemplating a new foundry will find it to their advantage to look into this, as the building is nearly new and we will sell at a bargain.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.



Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

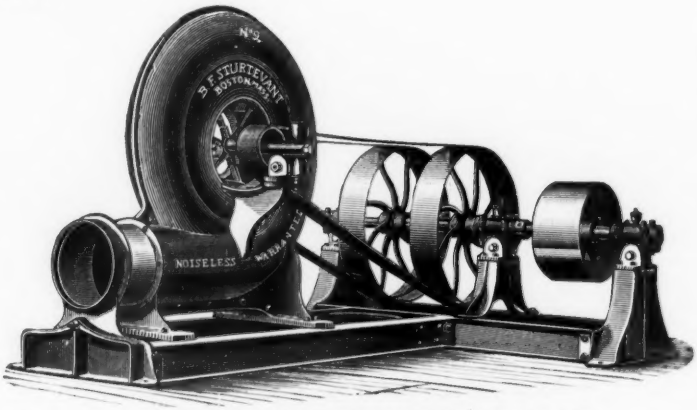
—FOR—

Cupola Furnaces and Forge Fires.

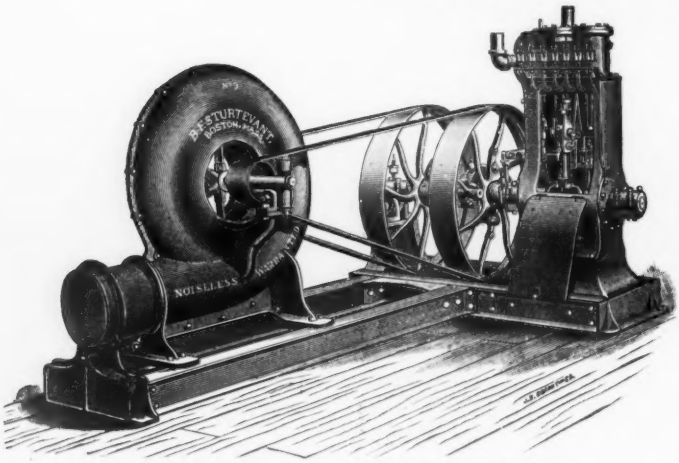
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors

Send for Catalogue.

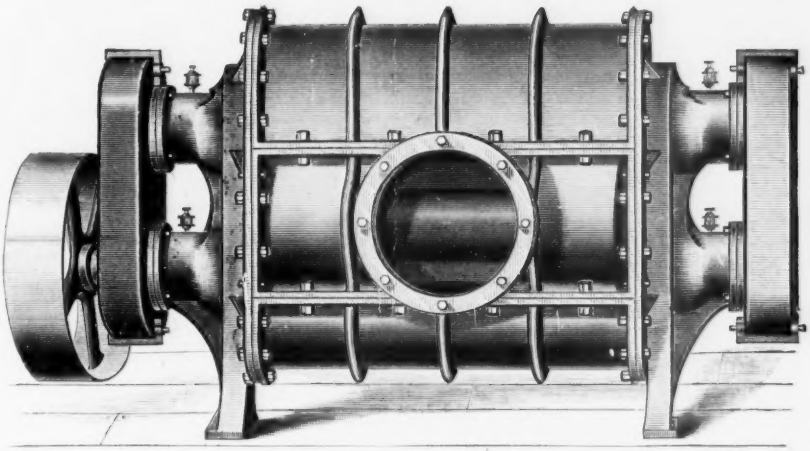
B. F. STURTEVANT CO.,

BOSTON, MASS.

131 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

STOCK CARRIED AT BRANCHES.

The Green Rotary Pressure Blower



Working parts are two perfectly balanced impellers, mounted on the best steel shafts, running in bronze bushes, cut gearing at both ends of the Blower enclosed in oil-tight casing.

Weighs less, occupies less space, costs less for freight than any other POSITIVE BLOWER in existance.

FOUNDRY BLOWERS

High Pressure Blowers

GAS EXHAUSTERS

Exhausters for Hot Gases

The GREEN Gives the Most Value for a $.

Wilbraham Baker Blower Co.,

2518 Frankford Ave., PHILADELPHIA, PA.

P. G. COCHRAN, President
JNO. H. WURTZ, Secretary
J. R. LAUGHREY, Treasurer
J. B. NEWMYER, Manager

COAL MINES & COKE WORKS
On Pittsburg & Lake Erie Railroad

GENERAL OFFICE
Dawson, Pa

SALES OFFICE
Pittsburg, Pa

WASHINGTON COAL & COKE CO.

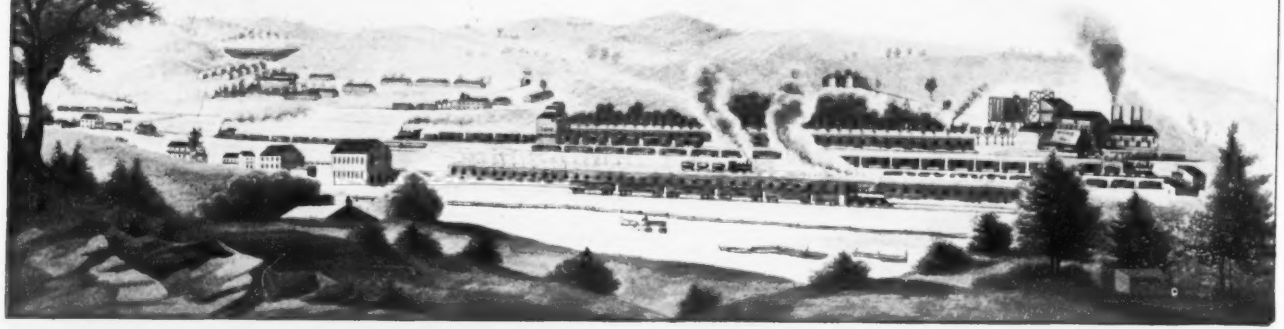
CAPITAL PAID UP $250,000.00

Youghiogheny Coal · High Grade Coke

INDIVIDUAL CARS.

DAWSON, PA.

N. P. HYNDMAN, Sales Agent
PITTSBURG, PA

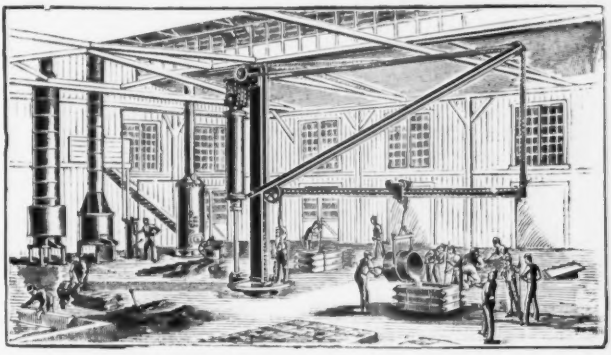


AMONG THE MILLIONAIRES.

(A HINT AS TO THE ROAD TO MILLIONAIREDOM.)

Just to show how the Ridgway Steam-Hydraulic is covering the country, and also to demonstrate that what we tell in these cards week after week is solid truth, we take the following little history in four chapters from our order book on this 14th day of May, 1897.

We merely select these four to represent North, South, East, West. We have others in between.



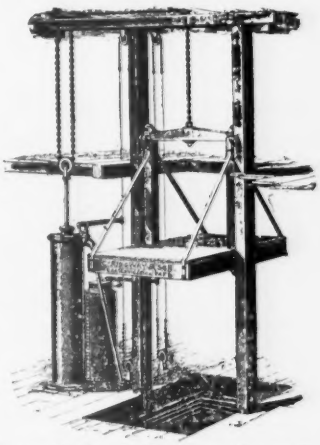
5-ton Steam-Hydraulic Crane in a Foundry.

Corrigan, McKinney & Co., Cleveland, O., needed cranes at their works. Long headed men as they are, they took the advice we urge and went and saw Ridgway Cranes in use doing their kind of work. That settled them at once. We are making them cranes as fast as we can, while they keep yelling "hurry, hurry."

The United Gas Improvement Co. own and build Gas Works all over the country. They have to hoist materials on these plants. They looked into the Ridgway Steam Hydraulic. It was at once adopted. Now putting up a big plant at Dallas, Texas, with our machine in it. If you happen to know anything about this great corporation you are aware that the fact they have adopted the Ridgway system, is the greatest endorsement the thing could possibly have. They employ the best Mechanical Engineers in the land. The company has a paid capital of $10,000,000.

The Hazard Mfg. Co., Wilkesbarre, Pa., the oldest and one of the largest Wire Rope factories in the country, decided to put power cranes in their works. The question was "which is the best?" They investigated a little and the Ridgway Steam-Hydraulic was at once selected, and at this writing the installation is now going on.

The American Tin Plate Co., Elwood, Ind., were the first to make tin plate in this country and have to-day the largest tin plate works in the world. They are still enlarging it. In this newest part they wanted only the best cranes money would buy. They spent a great deal of time and care in looking into the matter, with the result that Ridgway Cranes have been adopted throughout the plant and we are now making them.



Steam-Hydraulic Elevator, also made direct acting with cylinder under platform.

Say, brother, don't you think it worth your while to at least investigate a Crane that captures everybody who looks into it? Must it not have wonderful money-making powers if people are so anxious to get it? The above are only some, not all, who are getting these cranes. We do not have room to name the others.

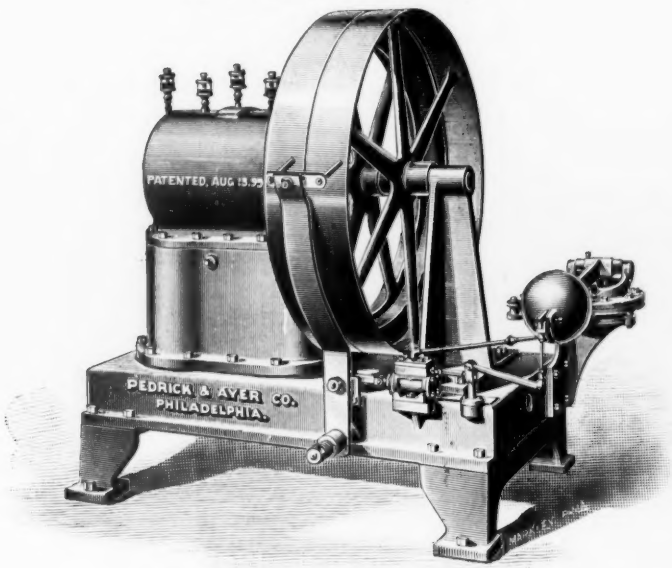
"PLEASE TAKE THE ELEVATOR."

OTHER ELEVATORS ARE NOT TO BE COMPARED.

CRAIG RIDGWAY & SON, COATESVILLE, PA.

Automatic Compound Belt Air Compressors.

PATENTED AUGUST 13TH 1895.



Straight Lift Hoist. **Built in two sizes, Nos. 1 and 2.**

No.	Size of Cylinders in inches	Revolutions per Minute.	Cubic Feet of Free Air	Horse Power Required.	Size of Pulleys in inches	Shipping Weight of Compressor	Floor Space in inches	Telegraphic Symbol
1	11x 6 6x 6	100-160	32- 50	2-3½	40x5	2875 lbs.	60x40	Parian
2	1:x10 8x10	90-120	90-120	9-15	60x6	5370 lbs.	76x60	Parish

HORIZONTAL HOIST.

PAT. SEPT 4 M 1894.

AIR HOSE COUPLING

For ½ inch, ¾ inch and 1 inch Hose.

These Compressors will compress more air at less cost than any other make, requiring no attention other than oiling; entirely automatic in action, stopping and starting as air is required. Specially adapted for foundry use. Can be run in series, if so, no stoppage impossible.

Horizontal Air Lift for low ceilings; for general lifting, quick in action and under perfect control of operator.

Straight Air Lift for foundry purposes when equipped with retaining and releasing valve, will hold the load whether heavy or light, in the desired position, as in case of lifting a ladle of molten iron and pouring it or raising a flask to knock out the sand. It can neither ascend or decend as long as connected to air supply.

Air Hose Couplings are designed to do away with long lines of hose. By having suspended along the air line a number of hose equipped with this device, connections can instantly be made or disconnected, allowing one hoist to serve in several places. Each size made in duplicate. Containing a shut-off valve.

Send for circulars and details to Pedrick & Ayer Co., Pneumatic Department.

PEDRICK & AYER CO.

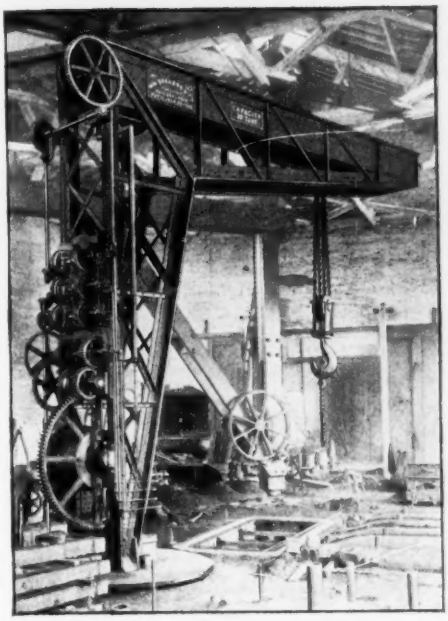
SPRING GARDEN STATION, PHILADELPHIA, PA.

Manning, Maxwell & Moore, *Sole Agents,* 111-113 Liberty St., New York City. 60 South Canal St., CHICAGO, ILL. 424 Telephone Bldg., PITTSBURG.

William Sellers & Co., Incorp.

PHILADELPHIA.

MODERN FOUNDRY MACHINERY



In connection with our Machine Tool Business, we conduct a large foundry where practical tests are continually made of new labor-saving devices. The manufacture of

IMPROVED FOUNDRY CRANES

has become an important feature.

The accompanying illustration shows a quick-acting 30-ton Steam Jib-Crane, erected in the foundry of J. Morton Poole Co., Wilmington, Del., superceding old wooden cranes, one of which appears in the background.

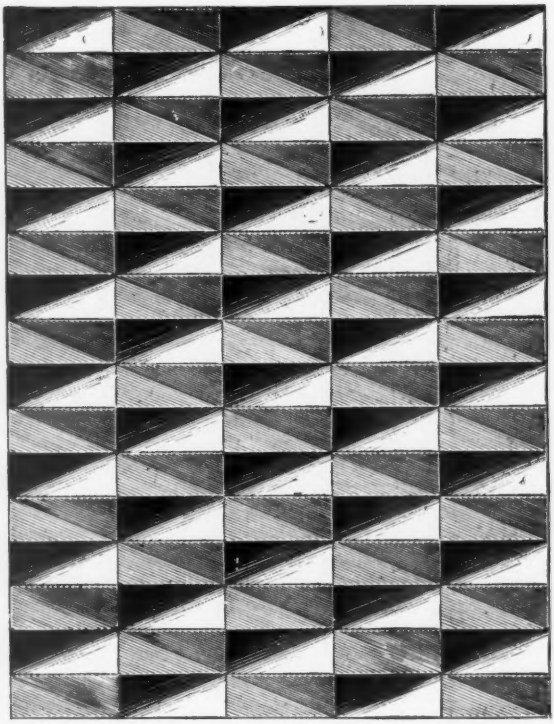
This crane is driven by independent 8" x 8" engines. The platform levers are near the floor. The effective radius of hook is 23 feet.

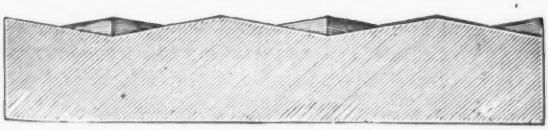
In future issues of this magazine, we will show illustrations of Jib and Traveling Cranes operated by electric motors.

Centrifugal Sand Mixer

Since the introduction and favorable reception of this effective, expeditious and economical **machine for preparing sand for molds and cores** we have simplified its construction and cheapened its cost. The capacity of the machine is remarkable, being limited only by the facilities for feeding sand into the hopper. Two men will easily shovel 5 tons an hour into the machine.

The qualities of "toughness" and "porosity" are materially improved by this process of preparing molding sand.





The above cut shows exact size of Diamonds.

Diamond Pattern Lumber,

—FOR—

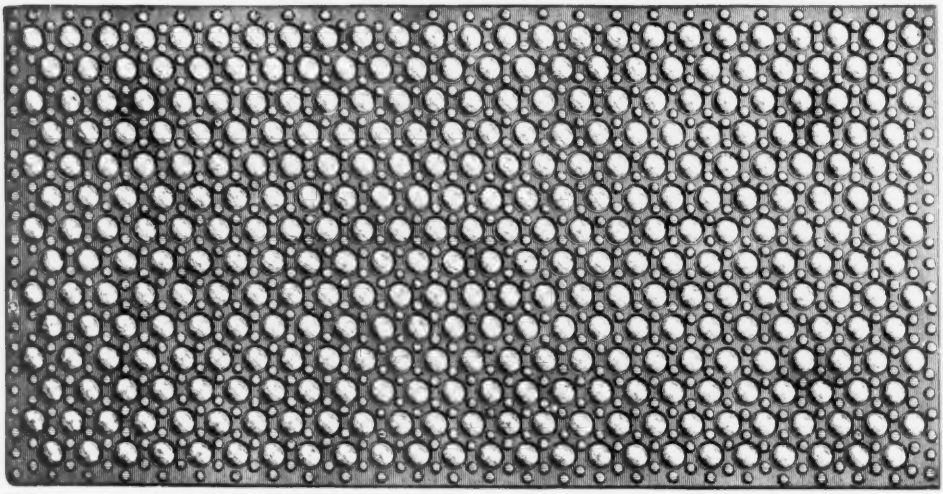
DOOR SILLS, PLATFORMS, STEP PLATES, Etc.

This Patent Lumber is made by a Special Machine invented by us, the ONLY Machine of its kind, and each piece will match PERFECTLY with all other pieces, by "joining" the edges to the centre, lengthwise, or any row of Diamonds. Size of each piece, 8 feet long by 6 inches wide, and ½ inch thick. Price 10 cents per running foot of 6 inches in width, NET CASH crated and delivered f. o. b. Chicago, in orders of not less than 6 pieces. Send for sample.

BROWN BROS. MFG. CO.

Cor. Clinton and Jackson Sts. Chicago.

PRISMATIC SIDEWALK LIGHT TILE.



Make your own frames and we will furnish you with Tiles for either Iron or Concrete Lights. Write for prices.

BROWN BROS. MFG. CO.,

Mention THE FOUNDRY. Cor. Jackson and Clinton Sts. CHICAGO.

It will be better for you to think About this matter the way we want you to!

OF COURSE, you will say: "Here is that man Ayers tooting his own horn again." But, now, neighbor, could we have tooted it for nearly fifteen years without having been of some service and benefit to the foundry trade at large? NIT! We have rendered full value for every dollar that has been turned over to us, and

We are prepared to do it again!

WHEN Your molders have drop-outs - - -
Castings are rough -
You find the sand cutting - - - -
Or a swell - - -
Everything fails -

YOU SAY Put more gaggers in. ——— the facing.
Ram softer.
Ram harder.
Dry the molds.

THOSE ANSWERS ARE NOT RIGHT.

You are instituting economy at the wrong end. A good molding sand would do away with most of your troubles. There are more dirty castings caused by using a poor sand than by dirty iron. The difference in price is small; why not get the best?

If every man Attended to his Own business

He would get along better. We attend to ours. We make it a business to see that you get what you need. All sands subjected to our own personal supervision. If you want to see what we have got, just let us know and tell us what kind of work you want it for. We can send you any grade of **Molding Sand** you may require, from the finest to the coarsest, and guarantee quality always the same. Our No. 1 Sand has no superior that we know of for Stove Plate, Hollow Ware, Grey Iron and Malleable Castings; our No. 4 is the best Sand in use for Heavy Castings of any kind. It is an extra good wearer and is always sure to turn out a perfect casting. Our Crude Plastic Fire Clay is very refractory and guaranteed to work plastic readily in water.

ZANESVILLE SAND HAS A REPUTATION . . .

If you try us once, we will have you with us forever.

E. M. AYERS ✻ MARKET BLOCK ZANESVILLE, OHIO.

Powellton Coke

**Is Physically and Chemically equal—
in many respects superior—
to any Coke made.**

Its Ash and Sulphur, especially Ash, is much lower than the Standard Coke, whilst its Carbon is correspondingly increased. We guarantee it to be uniform and to give the very best results, and those who know us, know that our guarantee is good.

It is made up as follows:

Coke, 46.48 per cent.
Cells, 53.52 per cent.

We have no fear of contradiction

when we say that no other so closely approaches the ideal Coke, which has been found to be . . . . . .

Coke, 44.00 per cent.
Cells, 56.00 per cent.

The Cell Walls of the Coke

are bright and hard, and careful tests by eminent authorities have demonstrated that it will support, without crushing, a cupola charged fully 25 per cent. greater than the Standard Connellsville. . .

Don't you think it would pay you to try it.

Write for Prices, and Physical and Chemical Tests. References too, if you want them.

The Mount Carbon Company, Ltd.

POWELLTON, WEST VIRGINIA.

No One Knows

How much Money

Real hard coin of the realm . . . . . .

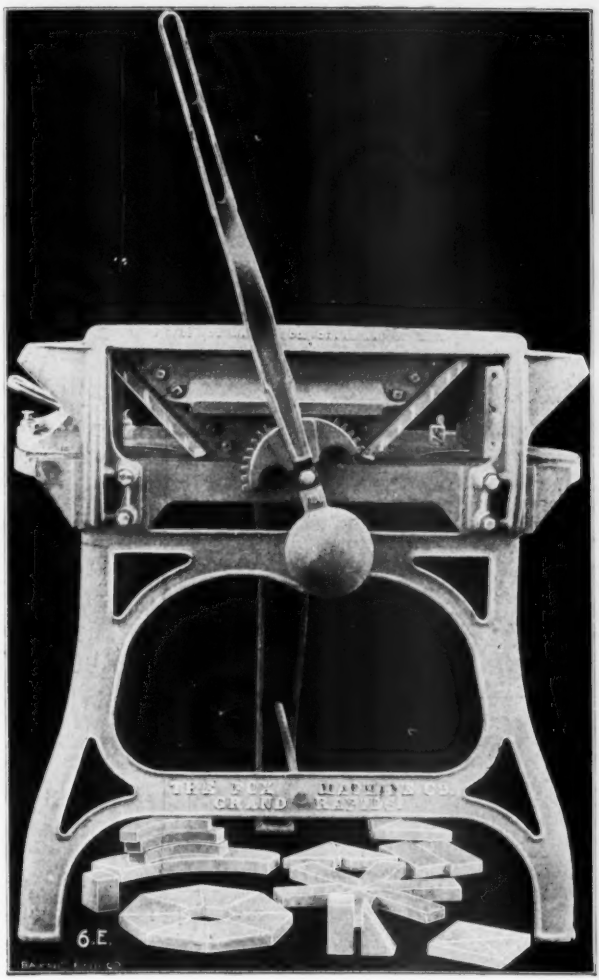
The Fox Universal Trimmer

will save, unless he has used them . . . . .

Not a useless Toy or idle Ornament

in the pattern room, . . but a real business-built machine for practical mechanics . . .

Sent on trial to Responsible People

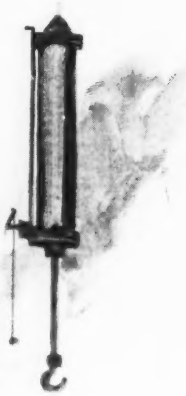


Inquiries Welcome. Catalogue Free.

FOX MACHINE CO.

850 N. Front Street, GRAND RAPIDS, MICH.

AIR HOISTS



SPEEDY, safe and inexpensive. Those who do not use them should get into the procession. Those who have them should examine our improved types.

Our new Air Hoist Circular (No. 14) is awaiting your requests. Send for it.

CRANES. LADLES.

THE

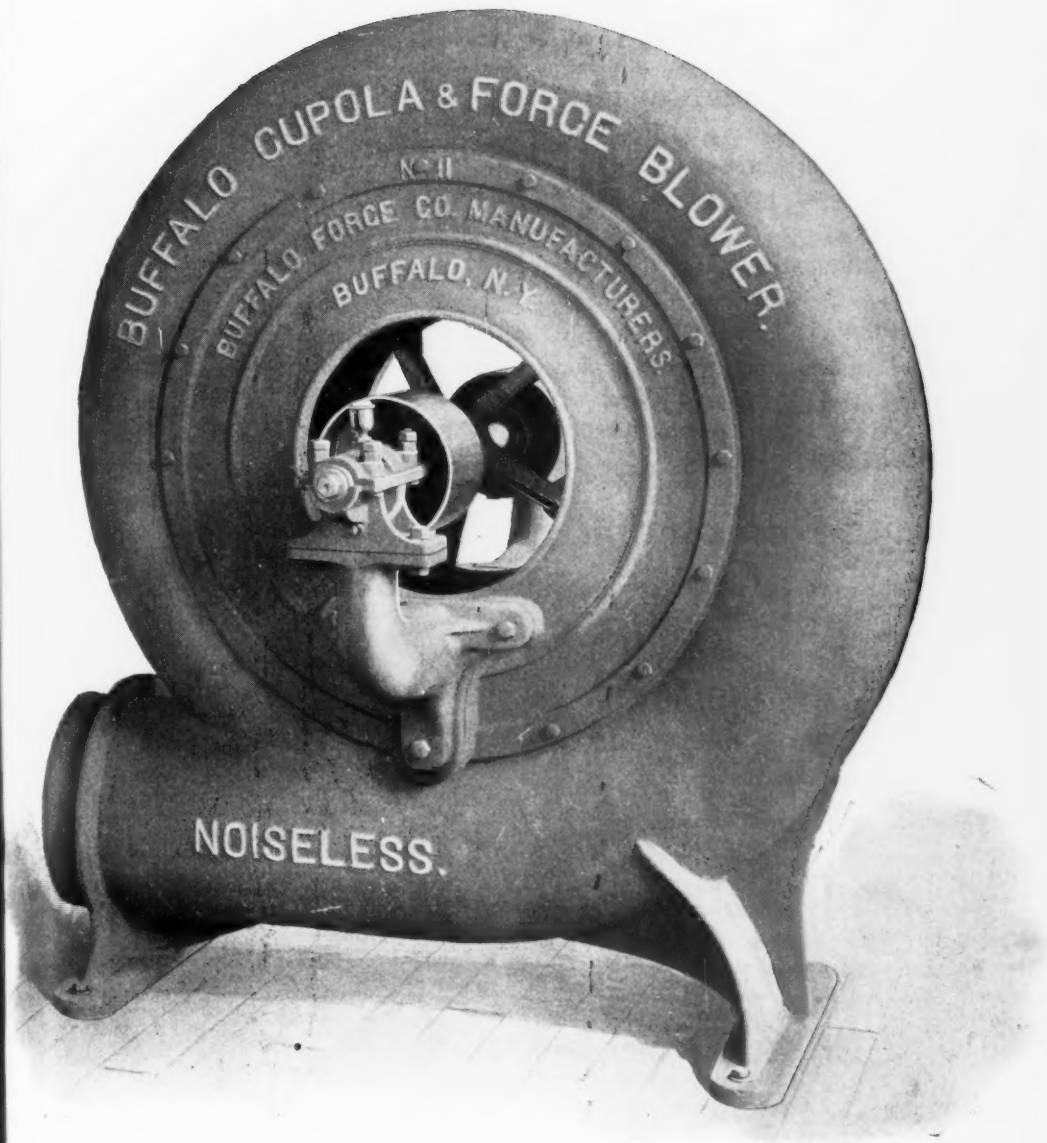
WHITING CUPOLA.

SEND FOR CIRCULARS.

Whiting Foundry Equipment Co.

HARVEY, ILL. (CHICAGO SUBURB.)

CHICAGO OFFICE—1533 MARQUETTE BUILDING.

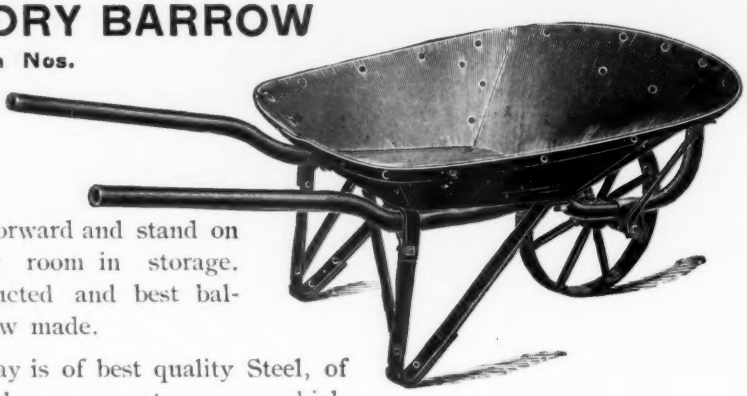


Furnished with Combined Adjustable Bed and Countershaft where desired.

"SYRACUSE" Steel Wheelbarrows

FOUNDRY BARROW

Ten Nos.



All dump forward and stand on end, saving room in storage. Best constructed and best balanced Barrow made.

The Tray is of best quality Steel, of uniform thickness save at corners, which are of double thickness, being smoothly lapped and riveted. The edges are rolled over a band of steel riveted under the flange. The Legs have renewable Steel Shoes. Patent Steel Wheel with Staggered Spokes. Heavily braced throughout. The most durable and easily handled Barrow made. Steel Charging and other Barrows in variety. Send for handsome Illustrated Barrow and Truck Catalogue No. 6

SYRACUSE CHILLED PLOW CO., Syracuse, N. Y.

Crucibles AND Plumbago

Progress is the order of the day and our improvements have been so marked that we have attained as high as 90 heats, as per testimonial attached.

New Orleans, La., Feb. 13, 1896.

HUSSMAN CRUCIBLE CO., St. Louis, Mo.:

Dear Sirs—Kindly send me four (4) No. 70 and four (4) No. 80 Crucibles. I think I have established a record for Plumbago Crucibles. I took out an even 90 heats from one of your No. 70 Pots. Trusting you will give this order your immediate attention, I am,

Very truly yours,

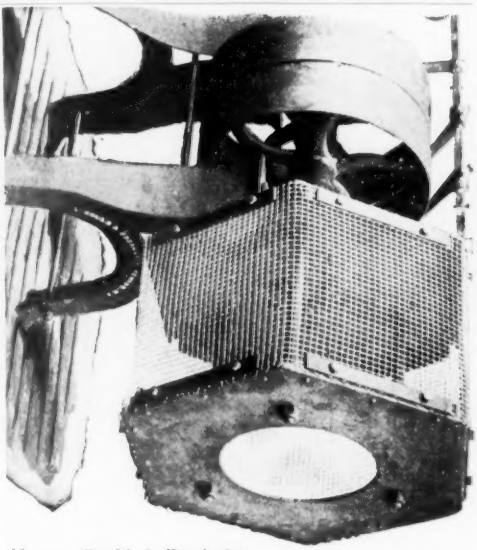
F. H. KORETKE,

922 Magazine Street, New Orleans, La.

CEYLON PLUMBAGO is the best for Facings, Lubricant, etc., and our prices the lowest.

Hussman Crucible Co.

ST. LOUIS, MO.



Messrs. Gould & Eberhrdt:

NEWARK, N. J. Aug. 19, 1896.

GENTLEMEN:- I have two of your Sand Sifters in use, and find them an excellent device for the preparation of Core and Facing Sand, as they sift and mix thoroughly, run with small amount of power, save the labor of one man even when run intermittently, and require but little care to keep in order. The finer seive is used as a dry Sifter and Mixer, the coarser one as a Mixer after the material is wet down. Yours truly,

S. J. MEEKER.

GOULD & EBERHARDT, NEWARK, N. J.

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.75 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month, $20.00
Half page - - -	" 12.00
Quarter page - -	" 7.00

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements must be in by the 20th of the month preceding publication to insure insertion.

The Coburn Patent Trolley Track

PARLOR DOOR HANGERS.

The adjustment is in the Track and not in the Hanger, as are others.

☞Send for Book.

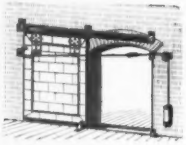
The Coburn Patent Trolley Track

BARN DOOR HANGERS.

Impsssible for door to jump the track. Very simple and cheap to apply.

☞Send for Book.

The Coburn Patent Trolley Track



FIRE DOOR HANGERS.

Recommended and adopted by fire underwriters all over the United States.

☞Send for Book.

The Coburn Patent Trolley Track

Overhead Tramway

Furnished complete with straight and curved track, switches, frog brackets, single and double carriers.

☞Send for Book.

The Coburn Patent Trolley Track

—AND—

Patent Rolling Ladder Systems

Over 10,000 in use in the U. S. Roll suspended from ceiling or facing the shelves.

☞Send for Book.

The Coburn Trolley Track Mfg. Co.,

HOLYOKE, MASS.

Look at the Wood We Burn into . . CHARCOAL

NO WONDER OUR

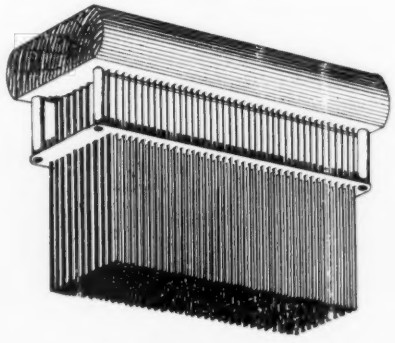
CHARCOAL FACING

is used in so many Brass and Stove Foundries.

LET US TALK IT OVER WITH YOU

Springfield Facing Co. SPRINGFIELD MASS.

Well, it doesn't look like anything you ever saw before



"IRON CLAD."

Guaranteed Satisfaction or Money Back. You Take no Risk.

SPECIAL FEATURES. Backs all in one piece; the wires uniformly distributed; each w re separately held and protected from excessive strain by a perforated tin plate; maximum stiffness with maximum elasticity; back with rounded sides; lightness combined with strength; elegance with usefulness; best material with finest workmanship; great durability at a moderate cost.

THE BUCHEL BRUSH CO., New Orleans, La.

St. Louis Agents—Todds & Stanley Mill Furnishing Co.

BUYERS' DIRECTORY.

ALUMINUM.
Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.

AIR HOISTS.
Pedrick & Ayer, Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

AIR COMPRESSORS.
Pedrick & Ayer, Philadelphia, Pa.

BARREL TRUCKS.
The Adams Co., Dubuque, Ia.

BLOWERS.
Buffalo Forge Co., Buffalo, N. Y.
Connersville Blower Co., Connersville, Ind.
Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass.
Wilbraham Baker Blower Co., Philadelphia, Pa.

BRASS FOUNDERS' SUPPLIES.
Brass Founders' Supply Co., Newark, N. J.
Garden City Sand Co., Chicago.
J. W. Paxson Co, Philadelphia, Pa.

BRONZES.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

CHARCOAL.
J. W. Paxson Co., Philadelphia, Pa.
Springfield Facing Co., Springfield, Mass.

COKE.
Mount Carbon Co., Ltd., Powellton, W. Va.
Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
American Glutrose Works, Philadelphia, Pa.
J. W. Paxson Co., Philadelphia, Pa.
Vreeland Tompkins, Jersey City, N. J.

CORE OVENS.
J. W. Paxson Co., Philadelphia, Pa.
Millett Core Oven Co., Brightwood, Mass.

CRANES.
Craig, Ridgway & Son, Coatesville, Pa.
Wm. Sellers Co., Phnadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

CRUCIBLES.
Garden City Sand Co., Chicago.
Hussman Crucible Co., St. Louis, Mo.
Joseph Dixon Crucible Co., Jersey City, N. J.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co. Robert J., Philadelphia, Pa.

CUPOLAS.
J. W. Paxson Co., Philadelphia, Pa.
Springfield Cupola Co., Springfield, Ohio
Whiting Foundry Equipment Co., Harvey, Ill.

ELEVATORS.
Ridgway & Son, Craig, Coatesville, Pa.

FIRE-BRICK.
Brooklyn Fire Brick Works, Brooklyn, N. Y.
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J. W. Paxson Co., Philadelphia, Pa.
Obermayer Company, The S., Cincinnati, O.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.

FLASKS.
Brass Founders' Supply Co., Newark, N. J.
Diamond Clamp & Flask Co., Richmond., Ind.
J. W. Paxson Co., Philadelphia, Pa.

FLEXIBLE SHAFTS.
Stow Mfg. Co., Binghamton, N. Y.

FOUNDRY LADLES.
J. W. Paxson Co., Philadelphia, Pa.
Obermayer Company, The S., Cincinnati, O.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.
Whiting Foundry Equipment Co., Harvey, Ill.

FOUNDRY PLANS.
Whiting Foundry Equipment Co., Harvey, Ill.

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Garden City Sand Co., Chicago.
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J. S. McCormick Company, Pittsburg, P
J. W. Paxson Co., Philadelphia, Pa.
Obermayer Company, The S., Cincinnati, O.
Smith Foundry Supply Co., Cincinnati, Ohio.
Springfield Facing Co., Springfield, Mass.
Whitehead Bros. Co., New York.

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Stow Mfg. Co., Binghampton, N. Y.

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Berlin Iron Bridge Company, East Berlin, Conn.
Wrought Iron Bridge Company, Canton, O.

IRON FILLER.
J. W. Paxson Co., Philadelphia, Pa.
Vreeland Tompkins, Jersey City, N. J.

MANGANESE AND SILICON.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

MOLDING MACHINES.
Henry E. Pridmore, Chicago, Ill.
J. W. Paxson Co., Philadelphia, Pa.
The Adams Co., Dubuque, Ia.
Tabor Mfg. Co., Elizabeth, N. J.

MOLDING SAND.
Ayers, E. M., Zanesville, Ohio.
Garden City Sand Co., Chicago, Ill.
J. W. Paxson Co., Philadelphia, Pa.
Whitehead Bros. Co., New York.

PHOSPHORUS.
Moro-Phillips Chemical Co., Philadelphia, Pa

PATTERN MAKERS.
The Gobeille Pattern Co., Cleveland, Ohio.

PIG IRON.
Clinton Iron & Steel Co., Pittsburgh, Pa.
Superior Charcoal Iron Co., Detroit, Mich.

PNEUMATIC CHIPPING TOOLS.
Chicago Pneumatic Tool Co., Chicago, Ill.

PLUMBAGO.
Garden City Sand Co., Chicago.
Hussman Crucible Co., St. Louis, Mo.
Joseph Dixon Crucible Co., Jersey City, N. J.
J. S. McCormick Company, Pittsburg, Pa.
McCullough-Dalzell Co., Pittsburg, Pa.
Obermayer Company, The S., Cincinnati, O.
Paxson & Co., J. W., Philadelphia, Pa.
Smith Foundry Supply Co., Cincinnati, Ohio
Springfield Facing Co., Springfield, Mass.
Whitehead Bros. Co., New York.

SAND SIFTERS.
Gould & Eberhardt, Newark, N. J.
J. W. Paxson Co, Philadelphia, Pa.
Springfield Foundry Co., Springfield, Ohio.
Wm. Sellers & Co., Philadelphia, Pa.

SAND BLAST MACHINERY.
Ward & Nash, Chicago, Ill.

STEEL WORKS SUPPLIES AND STOPPERS.
Joseph Dixon Crucible Co., Jersey City, N. J.
Hussman Crucible Co., St. Louis, Mo.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co., Robert J., Philadelphia,

TROLLEY TRACKS.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.

TUMBLING BARRELS.
Gould & Eberhardt, Newark, N. J.
J. W. Paxson Co., Philadelphia, Pa.
Stover Mfg. Co., Freeport, Ill.
Whiting Foundry Equipment Co., Harvey, Ill.

TRIMMERS.
Fox Machine Co., Grand Rapids, Mich.

WHEELBARROWS.
J. W. Paxson Co., Philadelphia, Pa.
Syracuse Chilled Plow Co., Syracuse, N. Y.

SKY LIGHTS.
Translucent Fabric Co., Quincy, Mass.

WIRE BRUSHES.
Buchel Brush Co., New Orleans, La.
J. W Paxson Co., Philadelphia, Pa.

WEIGHING MACHINES.
Garden City Sand Co., Chicago.

Do You Have Small Imperfections in Castings?

TRY TOMPKIN'S

"Smooth On" Castings Iron Compound.

ITS VALUE IS PROVED BY CONTINUED USE AND INCREASING SALES.

"SMOOTH ON" IRON T COMPOUND CASTINGS

VREELAND TOMPKINS, Manufacturing and Analytical Chemist, **551 COMMUNIPAW AVE. JERSEY CITY, N. J.**

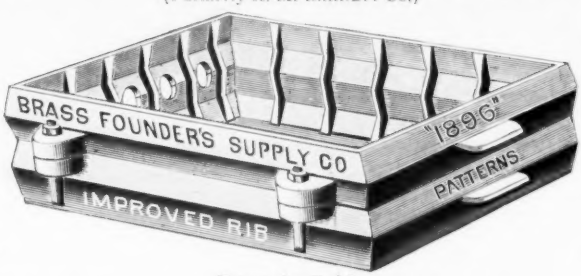
THE BRASS FOUNDERS SUPPLY CO.,

(Formerly R. M. BARNETT CO.)

Makers of

FLASKS
FURNACES
FOUNDRY

Supplies and Specialties.



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The Improved

RIB, BEVELED, and Special Designs.

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THE RIBBED

IT IS BEST!

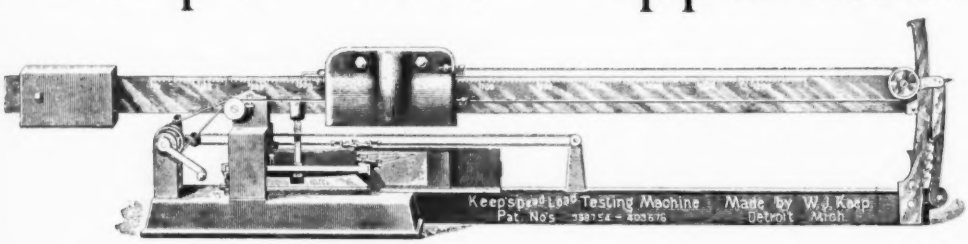
Stronger and Cheaper than any others.

R. M. BARNETT, J. S. MUNDY.

30-34 PROSPECT STREET, NEWARK, N. J.

Write for Catalogue.

"Keep's Test" Apparatus.



HERE IS WHAT ONE LARGE CONCERN SAYS:-IT HAS PAID THEM, WHY NOT YOU?

DETROIT, MICH., March 31st, 1896.

Mr. W. J. Keep, City:

DEAR SIR: We have regulated our foundry mixture by "Keep's Test" during the past year, and can recommend it in highest terms. We know exactly what we are doing and can keep our castings of uniform quality. We find that .160 inches per foot the best shrinkage, and have been able to keep the average strength of a test bar ½ inch square and 12 inches long at 450 pounds.

Very truly yours,

LELAND & FAULCONER MFG. CO.,
H. M. LELAND, Vice-President.

To SAVE MONEY IN YOUR OWN FOUNDRY, ADDRESS **W. J. KEEP, Detroit, Mich.**

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

15 Beekman Street, NEW YORK

Boston Office, 85 Water Street

F. A. GOODRICH & CO.

Incorporated

PIG IRON, STEEL, COKE, ETC.

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Manufacturers, Importers and Dealers in

PIG IRON AND IRON ORE.

Rookery Building, CHICAGO.

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PIG IRON-COKE.

CINCINNATI.

CLINTON IRON & STEEL CO.

Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

PITTSBURG, PA

15 Cortlandt St., NEW YORK.

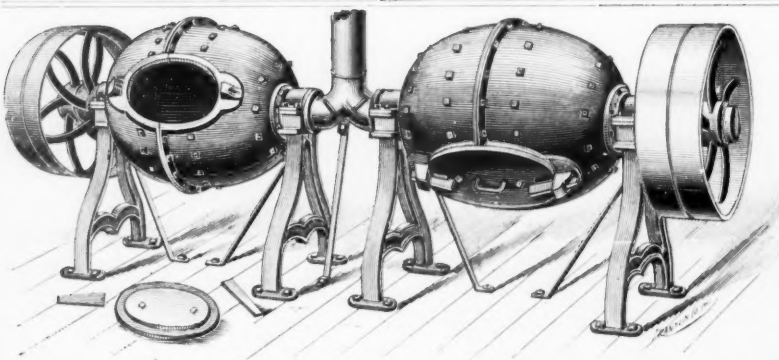
ROGERS, BROWN & CO.

CINCINNATI, CHICAGO,

BUFFALO,

PHILADELPHIA, NEW YORK,

ST. LOUIS



A Fine Pair

Stover's IMPROVED EXHAUST Tumbling Barrels

The Stover Egg Shaped Barrel does doublethe work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron wire nails, or any other small articles that require cleaning and polishing.

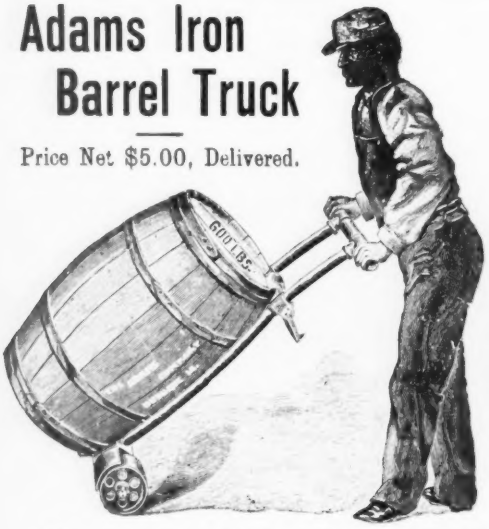
For full particulars, address,

Stover Manufacturing Co.

205 RIVER STREET, FREEPORT ILL

Adams Iron Barrel Truck

Price Net $5.00, Delivered.



One man can attach and move **heavily** loaded barrels, with or without heads, not touching the barrels with his hands.

More description furnished on application.

Manufactured by

THE ADAMS COMPANY. DUBUQUE, . . . IOWA.

ESTABLISHED 1854.

Brooklyn Fire Brick Works

CUPOLA BLOCKS, FIRE SAND, FIRE CLAY, FIRE MORTAR, KAOLIN

AND ALL FIRE MATERIAL REQUIRED FOR FOUNDRY PURPOSES.

Send for Illustrated Catalogue and Prices.

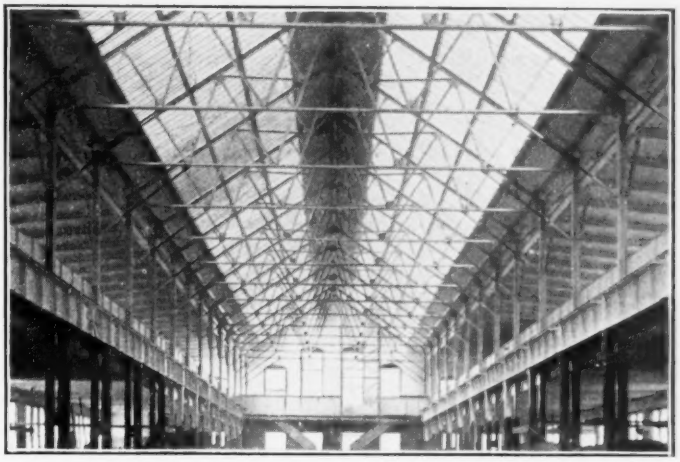
88 Van Dyke Street, BROOKLYN, N. Y.

When planning for additions or repairs to your buildings . . this spring . . . .

DO NOT FORGET to write us for information regarding .

TRANSLUCENT FABRIC

SKYLIGHTS



They are especially adapted for . . . .

Foundries

Because they cannot break, never leak, require no repairing, and are inexpensive to build . . . . .

CATALOGUE and SAMPLES FREE

TRANSLUCENT FABRIC CO. ❀ QUINCY, MASS.

GLUTROSE

(Trade Mark.)

The Universal Liquid Core Compound

Patented in the United States, England, France and Belgium.

GLUTROSE was invented and is manufactured by a practical foundryman of many years' experience. It has been used in the Pennsylvania Railroad Foundry at Altoona and other large foundries for the past three years with the most satisfactory results.

It is cheaper and better than flour, rosin, oil or any other compound in use, takes the place of all other materials and never varies in quality.

Makes the most difficult cores for iron or brass of any size.

The cores come out easily and leave the castings smooth.

Will let the air and gases off from a core which is difficult to vent better than any other material in use and makes no offensive smell or smoke.

WILL NEVER BLOW THE CASTINGS.

AMERICAN GLUTROSE WORKS

OFFICE:
PENN MUTUAL BUILDING,
No. 925 Chestnut Street, Philadelphia.

Your Friend the....

Kenwood Bicycle

A Wheel You Can Depend Upon.

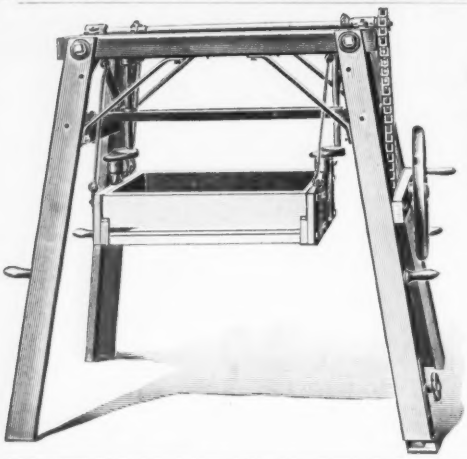
For Lightness, Swiftness and Strength it is Unsurpassed.

You can learn all about it by addressing

Hamilton Kenwood Cycle Co.
203-205-207 S. Canal St., Chicago.

We make patterns cheaper, better and in a fraction of the time required to get them out elsewhere. Do you realize that a small pattern shop is a nuisance? It is either a feast or a famine all the time.

The Gobeille Pattern Co., Cleveland, Ohio.



THE PERFECT

Sand Riddling Machine

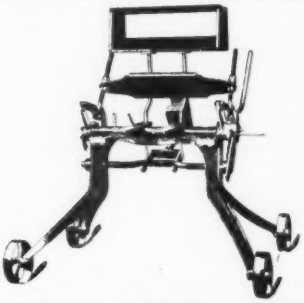
This is the Best, Simplest, Cheapest, Most Durable and Most Easily Operated Sand Riddling Machine made.

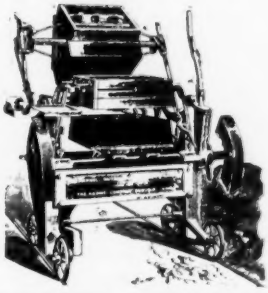
For full particulars and references, address,

THE SPRINGFIELD FOUNDRY CO.

SPRINGFIELD, OHIO.

FARWELL'S **MOULDING MACHINES** Send for Catalogue





THE ADAMS COMPANY, DUBUQUE, IOWA

ESTABLISHED 1853.

Guaranteed Pure . . . **"AMERICAN PHOSPHORUS"**

FOR

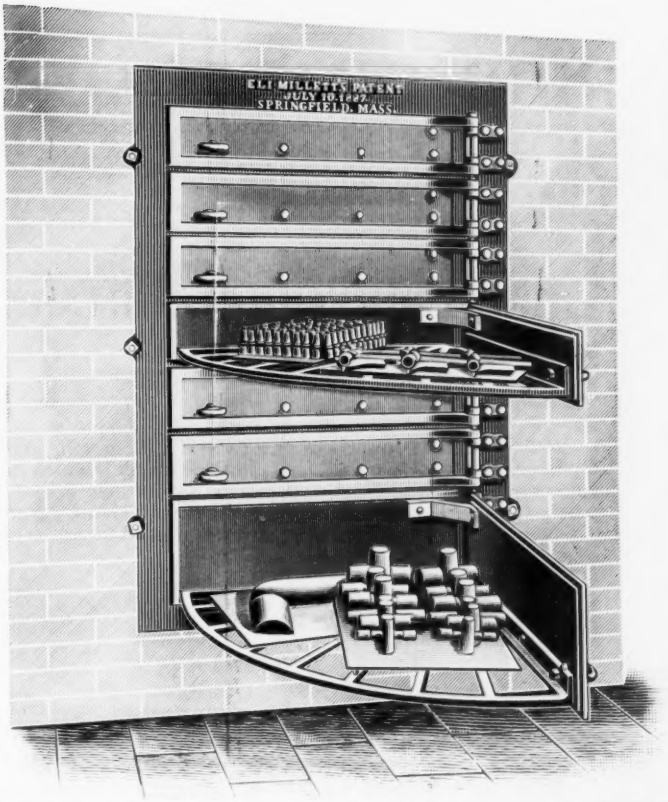
PHOSPHOR METALS,
MATCHES,
ETC.

PHOSPHORUS

Also
TIN FLUX,
OIL VITROL, AQUA AMMONIA,
NITRIC ACID, MURIATIC ACID,
GLAUBER'S SALT.

Manufactured by

MORO-PHILLIPS CHEMICAL CO., 131 S. 3rd St., Philadelphia, Pa.



Millett's Patent Core Oven

THE BEST IN THE WORLD

No Foundry using small cores can afford to be without it.

Over one hundred and fifty in use.

Send for our new Catalogue giving names of those using them.

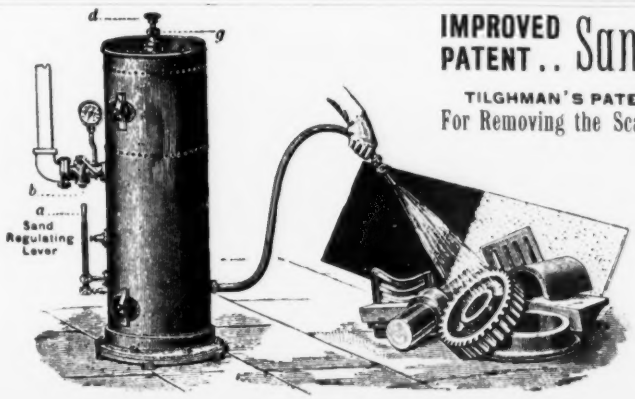
Millett Core Oven Co.

BRIGHTWOOD, MASS.

A DIAMOND

Flask is made right, wears well and gives the greatest satisfaction in use. We can give you a choice of latches and fill your order on an hour's notice. Write us for disconnt sheet and we will give you some pointers on flask construction, such as are seen only in the **DIAMOND.**

DIAMOND CLAMP AND FLASK CO., RICHMOND, IND.



IMPROVED PATENT.. Sand Blast Machinery

TILGHMAN'S PATENTS. MATHEWSON'S PATENTS.

For Removing the Scale from Iron and Steel Plates.

Cleaning Castings, Forgings, etc.

WARD & NASH,

SOLE AGENTS,

35-37 So. Canal Street, CHICAGO.

23-25 Purchase St., BOSTON.

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THE SUPERIOR CHARCOAL IRON COMPANY

Exclusive Dealers in the following well known brands of

ANTRIM, ELK RAPIDS,
GAYLORD, HINKLE,
PIONEER, PENINSULAR,
UNION, SPRING LAKE.

Lake Superior Charcoal Pig Iron

All business connected with the sale of the above brands of Charcoal Pig Iron will, from April 1st, 1897, be handled by **The Superior Charcoal Iron Co.**, of Detroit, Mich., which is thus enabled to supply the best iron known for all purposes, and especially for Car Wheels, Malleable Castings, Boiler Tubes, Ship and Armor Plate, Strong High Silicon for Foundry purposes, Basic Iron with the minimum of Silicon and Sulphur, also Iron to take the place of Salisbury, Southern and Swedish Charcoal Iron.

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WM. G. MATHER, Pres.
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Clinton Iron & Steel Co.

"FAIR DEALING" Their Motto.

MANUFACTURERS OF

"CLINTON" AND "HECTOR"

INSPECTED FOUNDRY IRONS . . . .

ALSO

Sole Factors for DUNBAR STRONG IRON

In New York and New England.

None but the Best Southern Irons Sold.

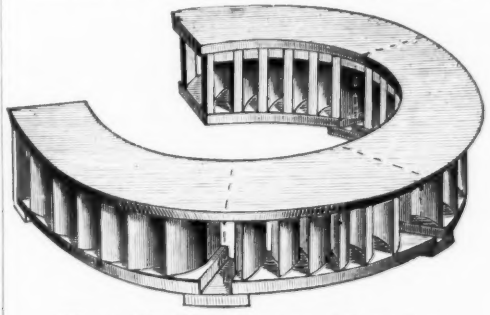
FURNACES, PITTSBURGH.

NEW YORK OFFICE, No. 15 Cortlandt St.

Why deal with Commission people or Agents who give fancy names to Irons and know nothing about their manufacture.

DEAL WITH THE MANUFACTURER DIRECT.

Adopted by the U. S. Navy Department.



The combination of Sections of Tuyeres as placed in wall.

How About a new cupola now that "good times" are in sight? That old one, which you have been patching up since the panic of '93, cannot stand the strain much longer. If you want the best possible results as regards economy of fuel, rapid melting and a uniform strength of castings, not to mention the **lowest price**, it will pay you to investigate the **BLAKENEY.** The secret is in **perfect combustion.** The **continuous curved tuyeres** assures that in the highest degree. Let us send you a descriptive circular.

THE SPRINGFIELD CUPOLA CO.

SPRINGFIELD, OHIO.

You can get anything wanted AT THE

FOUNDRY SUPPLY DEPOT

OF

J. S. McCormick Co. PITTSBURG, PA.

FOUNDRY MOLDING MACHINES, STRIPPING PLATE MACHINES, PORTABLE, AIR-POWER, MACHINES,

USING WOOD OR METAL SPLIT PATTERNS, WITHOUT STRIPPING PLATES.

Write for information.

The Tabor M'f'g Co.,

ELIZABETH, N. J.

ESTABLISHED 1875.

STOW MANUF'G CO.,

BINGHAMTON, N. Y.

INVENTORS OF THE

FLEXIBLE SHAFT

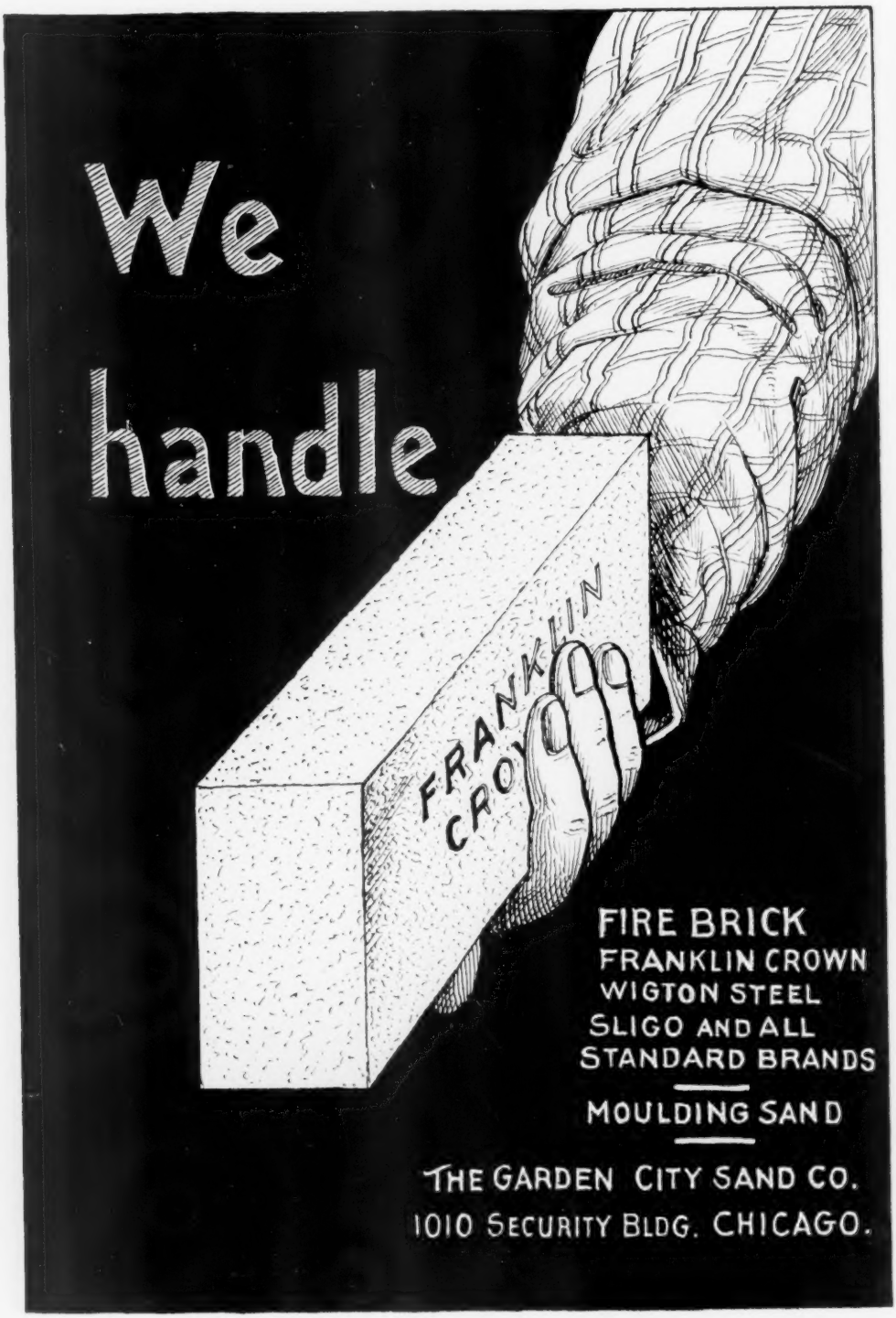
FOR ALL PURPOSES.

The oldest and largest manufacturers in the world

PORTABLE EMERY GRINDER

Take the tool to the work and save heavy handling.

WRITE US FOR CATALOGUE AND PRICES.


We handle
FRANKLIN
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FIRE BRICK
FRANKLIN CROWN
WIGTON STEEL
SLIGO AND ALL
STANDARD BRANDS
MOULDING SAND
THE GARDEN CITY SAND CO.
1010 SECURITY BLDG. CHICAGO.

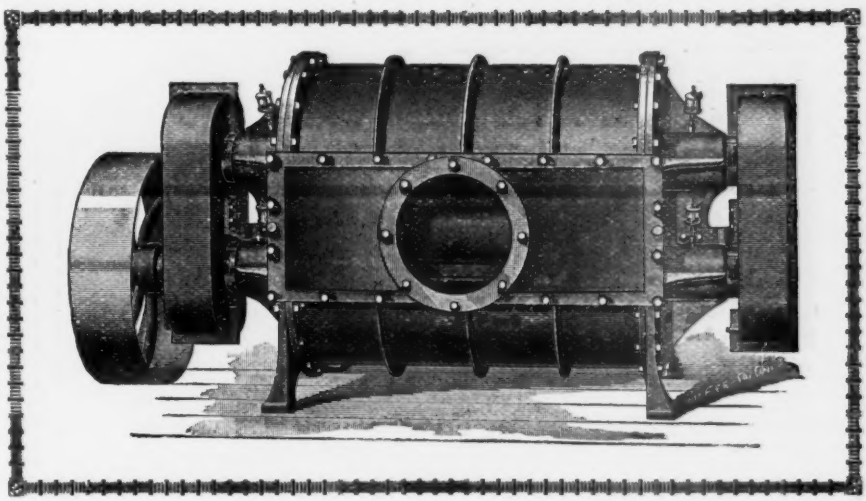
. . . OVER . . .

30,000

HAVE BEEN PUT
ON THE MARKET

ROOTS' . .

Positive.. Pressure Blowers..



OUR BLOWERS

Embody an experience of forty years' in the construction of machines of this type . . . . . .

P. H. & F. M. ROOTS Co.

CONNERSVILLE, IND.

NEW YORK OFFICE, 109 Liberty Street.

ROOTS'

Rotary Pressure Blower

Is used in almost every Country on the Earth's surface.

THEY REPRESENT

In their manufacture the concentrated experience and wisdom of some of the world's best mechanics and have become famous for the perfection of their workmanship, as well as their efficiency and economy.

PERFECTLY SATISFACTORY SERVICE.

Pittsburg, Pa., February 27, 1895.

P. H. & F. M. Roots Co., Connersville, Ind.:

Gentlemen—In reply to your inquiry of the 25th inst., we beg to say that we have been using your No. 4 Blower, without engine, for our cupola furnace, and it has given us perfectly satisfactory service.

Yours truly,
THE McCONWAY & TORLEY CO.,
C. P. Krauth, Sec'y.

ROOTS' BLOWERS FAR SUPERIOR.

Joliet, Ill., March 7, 1892.

P. H. & F. M. Roots Co., Connersville, Ind.:

Gentlemen—Replying to your favor of March 1st, we are pleased to report that the No. 6 Blower, purchased of you some time ago, has given us good satisfaction. We have used in our works both Fans and Blowers, but must confess that we consider the Roots Blower far superior.

Very truly,
BATES MACHINE CO.,
E. E. Wolcott, Asst. Supt.

EIGHT YEARS AND STILL IN FIRST-CLASS CONDITION.

Cincinnati, O., May 24, 1895.

P. H. & F. M. Roots Co., Connersville, Ind.:

Gentlemen—We take pleasure in stating that we have had 4 of your large Roots Blowers in use at our works for 8 years. These Blowers have given thorough satisfaction and are still in first-class condition.

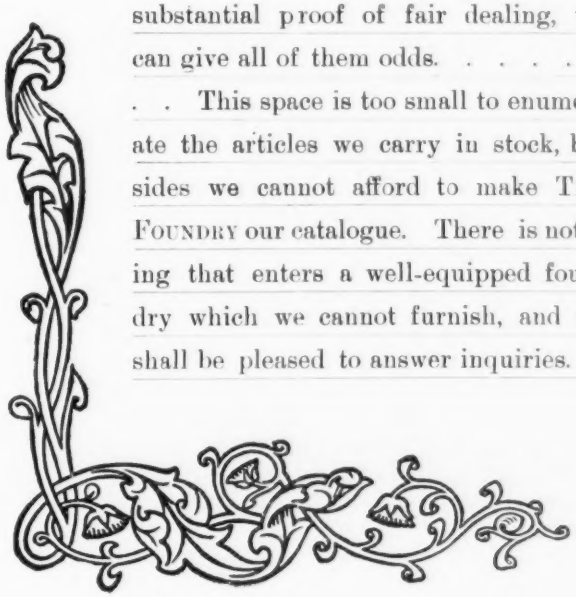
Very truly,
THE ADDYSTON PIPE & STEEL CO.,
Eliot A. Kebler, Sec'y.

P. H. & F. M. Roots Co., Connersville, Ind.

NEW YORK OFFICE, 109 Liberty Street.

Our Position

for manufacturing and distributing all kinds of foundry supplies is unequaled. That this advantage is shared by our patrons is proven by the increased number of foundrymen added to our own list of customers. We may not be as long-winded as some of our competitors, but when it comes to furnishing substantial proof of fair dealing, we can give all of them odds. . . . . This space is too small to enumerate the articles we carry in stock, besides we cannot afford to make THE FOUNDRY our catalogue. There is nothing that enters a well-equipped foundry which we cannot furnish, and we shall be pleased to answer inquiries.



THE S. OBERMAYER CO

CINCINNATI, OHIO

Factories at . . . . **Cincinnati, Ohio.**
Chicago, Ill.
Larimer, Pa.
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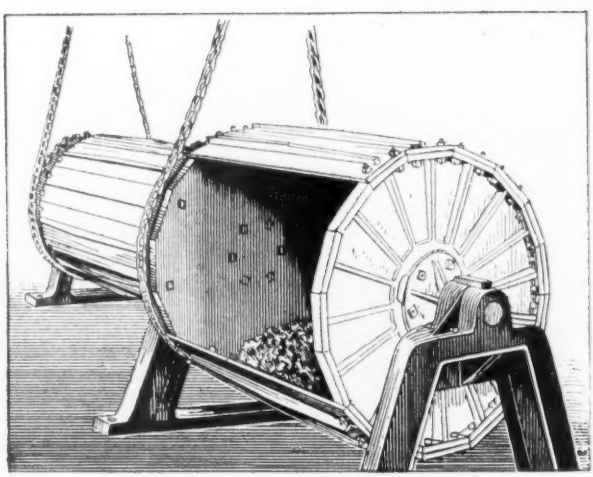
J. W. PAXSON CO.

PHILADELPHIA, PA.

The Blankley Rumbler.



This is the cheapest and most economical Rumbler in the market. No Gears or Leather Belts to wear out by dust. It is run by Chain Belt. . . . .

SIZE and WEIGHT.

30 inches in diameter by 48 inches long, about 2,400 lbs.
40 inches in diameter by 48 inches long, about 3,300 lbs.

Price, F. O. B. Cars Philadelphia, 3c per lb.

A Word

as to

Joseph Dixon Invented the Plumbago Crucible

DATE OF INVENTION
1826.

Dixon's Crucibles have been in the Market SEVENTY YEARS.

Dixon's Plumbago Crucibles

Dixon's Crucibles are Standard all over the GLOBE.
Dixon's Crucibles are used in every country on the Globe where metals are melted.
Dixon's Crucibles have the highest records for HEATS.
Dixon's Crucibles are made to get

BEST RESULTS WITH THE LEAST COAL.

Dixon's Crucibles are made of many mixtures to suit all kinds of work.
Dixon's Crucibles are made special for Steel Melting.
Dixon's Crucibles are made special for Nickel Melting.
Dixon's Crucibles are made special for Brass Melting.
Dixon's Crucibles are made special for Composition Melting.
Dixon's Crucibles are made special for Phosphor Bronze Melting.
Dixon's Crucibles are made special for German Silver Melting.
Dixon's Crucibles are made special for the Melting of Precious Metals.

In ordering you will be benefitted by mentioning the kind of Metals melted. Write for pamphlet **"How to Use Plumbago Crucibles."** The best are the cheapest, as they must stand the punishment of high heat and much wear and tear. The "Dixon" records in average efficiency, in general good behaviour and in volume of sales, far in the lead.

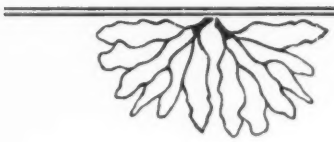
Jos. Dixon Crucible Company,

JERSEY CITY, N. J.

Whitehead Brothers Company,

DEALERS IN

Molding Sand



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PHILADELPHIA SAND
FRENCH SAND,
FIRE CLAY, KAOLIN,
FOUNDRY FACINGS
and SUPPLIES
OF ALL KINDS.
LEAD FACINGS
A SPECIALTY.

Albany Sand for Brass and Stove Plate Castings.

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Providence Office,
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Established 1872. Incorporated 1895.

McCullough-Dalzell Company

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CRUCIBLES for Brass Melting .

CRUCIBLES for Steel Melting .

CRUCIBLES for All Purposes . .

CRUCIBLES of All Sizes . . .

STOPPERS, Twenty-one Styles .

LIDS, COVERS, CAPS, . . .

PHOSPHORIZERS . . . .

PLUMBAGO FINE DUST . . .

ALL ARTICLES CONTAINING PLUMBAGO

Crucible.

Crucible

Dipper.

Cover.

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Crucibles

For melting Steel, Brass, Copper, Gold, Silver, Nickel and Metals and Alloys of Every Description; SmallCrucibles for making Assays and fine pure Plumbago for lubricating, etc.

We are practical workmen and have studied the requirements of the different metal works in this country, as well as in Europe. We also work strictly by chemical analysis, giving a uniformity at all times never before approached in this or any other country.

We make All Sizes, from 8 oz. to 2 ton Capacity.

ROBT. J. TAYLOR & SON,

1900 to 1916
CALLOW HILL STREET, PHILADELPHIA, PA.

We Guarantee..

That one man with one of our **PNEUMATIC HAMMERS** can do more and better work than four men working in the ordinary way.

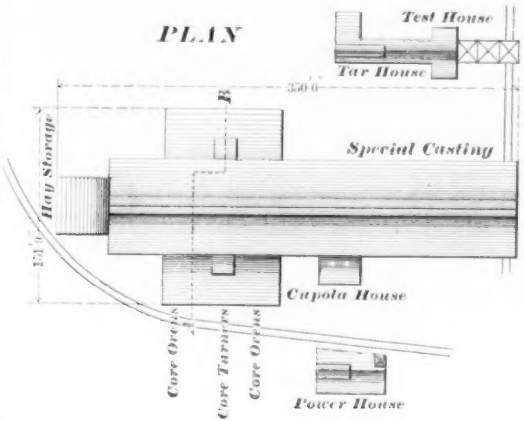
These same Hammers are also especially adapted for calking boilers and beading flues.

We also manufacture the best Air Drill on the market, and our Air Hoist and Compressors are especially designed for foundry work.

All tools sent on ten days' trial, subject to approval and are guaranteed for one year.

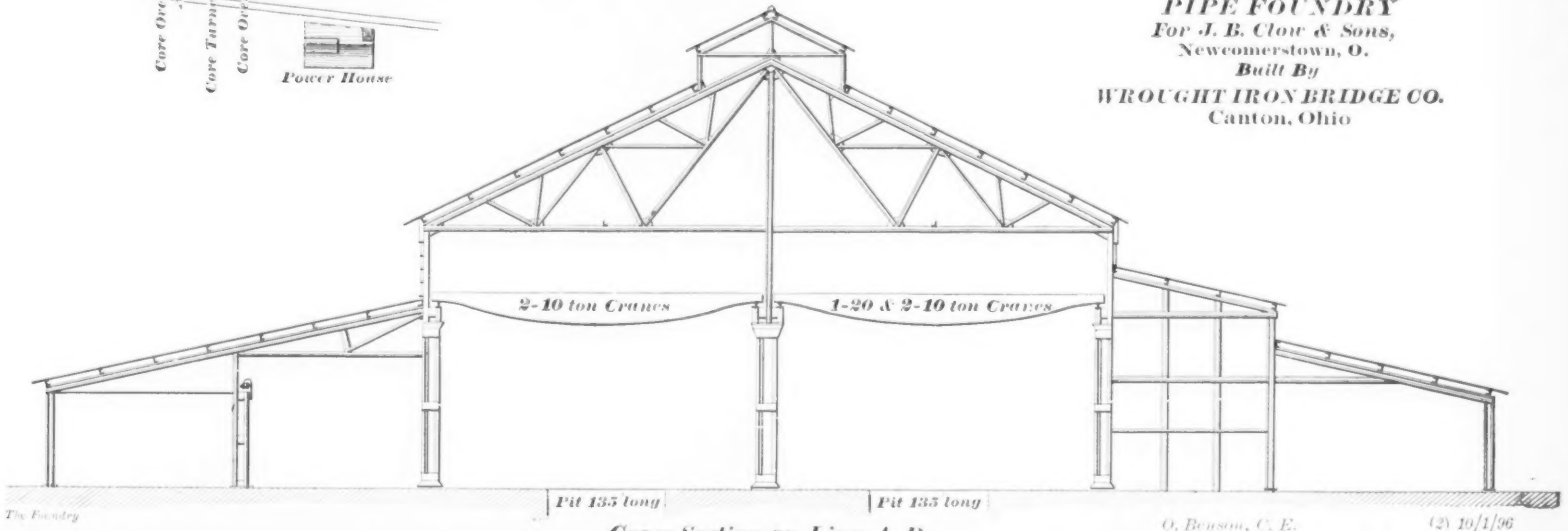
Chicago Pneumatic Tool Co.,

635 Monadnock Building, CHICAGO, ILL.



WROUGHT IRON BRIDGE CO.

PIPE FOUNDRY
For J. B. Clow & Sons,
Newcomerstown, O.
Built By
WROUGHT IRON BRIDGE CO.
Canton, Ohio



Cross Section on Line A-B

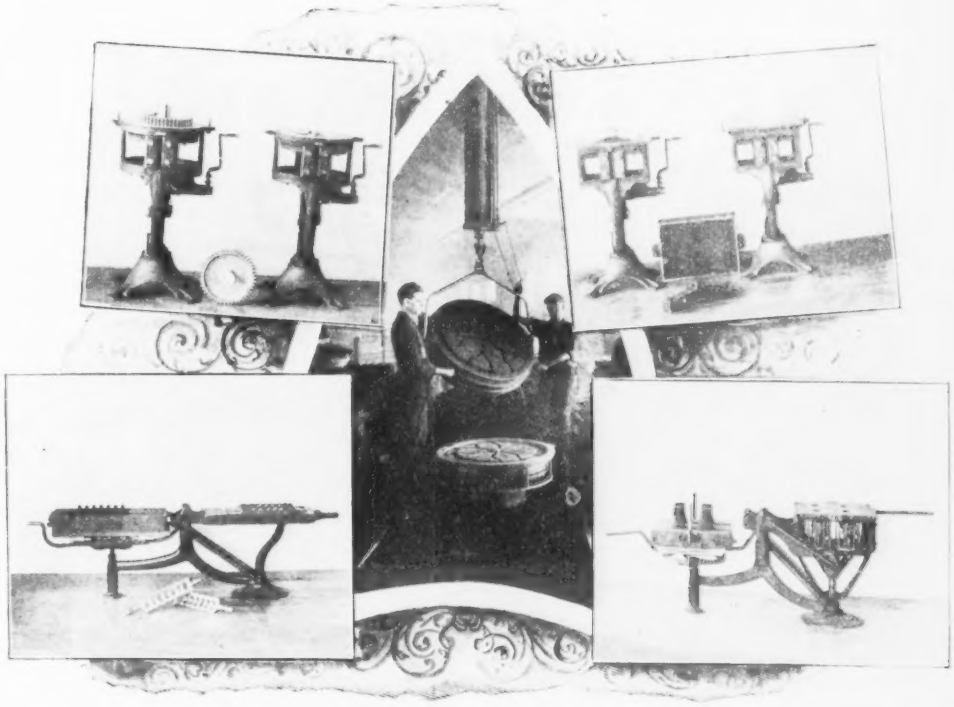
We design and construct Foundries, Machine Shops and similar structures. Also Roofs, Turntables and Bridges of every description.

Principal Office and Works at Canton, O.
Branch Offices at New York, Chicago, Indianapolis and Kansas City.

MOLDING MACHINES

FOR ALL CLASSES OF WORK.

STRAIGHT DRAW, ROCKOVER, AUTOMATIC DRAW ROCKOVER,
IN OVER TWENTY DIFFERENT SIZES.



Guaranteed to pay out in Six Months When run to their full capacity.

The Pridmore Molding Machines

INSURE BETTER AND MORE UNIFORM CASTINGS.
LESSEN COST OF MACHINE WORK ON CASTINGS.
LIGHTEN THE LABOR AND SIMPLIFY FOUNDRY METHODS.
SAVE FIFTY TO SEVENTY-FIVE PER CENT.

Those having Grey Iron or Brass Castings to make in reasonable quantities, will do well to write for full information and lists of many foundries now using these machines. Estimates, prices, terms, etc., will be promptly furnished. Rights to use these machines for Malleable Iron and Steel Castings are reserved. Address,

HENRY E. PRIDMORE,

111-113 W. Harrison St., CHICAGO, ILL., U. S. A.

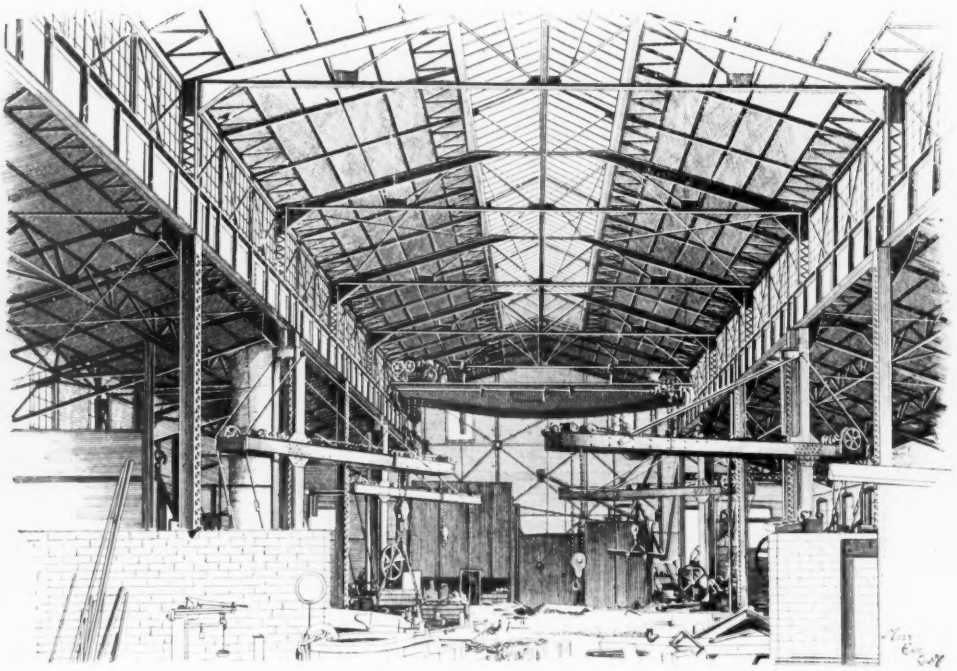
CHAS. M. JARVIS, President. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS

AND BUILDERS OF

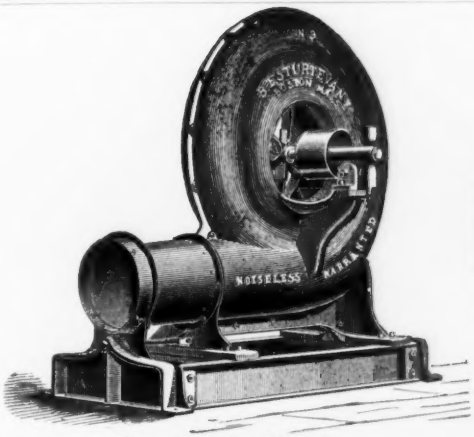
Iron and Steel Bridges, Roofs and Buildings.



The above illustration is taken direct from a photograph and shows the interior of a foundry building which was designed and built by us for S. F. Hodge & Co., at Detroit, Mich. Each wing is 24 feet in width and the central portion is 40 feet in width, this latter controlled by a crane with a travel the full length of the building. The crane girder posts are designed to carry jib cranes as shown. The roof is covered with our patent Anti-Condensation Corrugated Iron The building is absolutely fire-proof, and the corrugated iron roof is guaranteed not to drip in the coldest weather.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.



Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

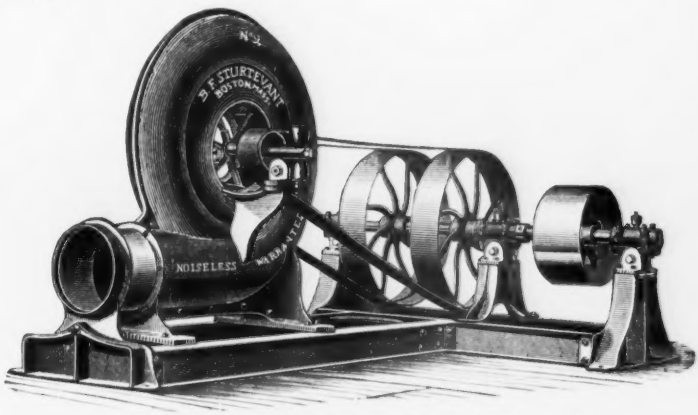
—FOR—

Cupola Furnaces and Forge Fires.

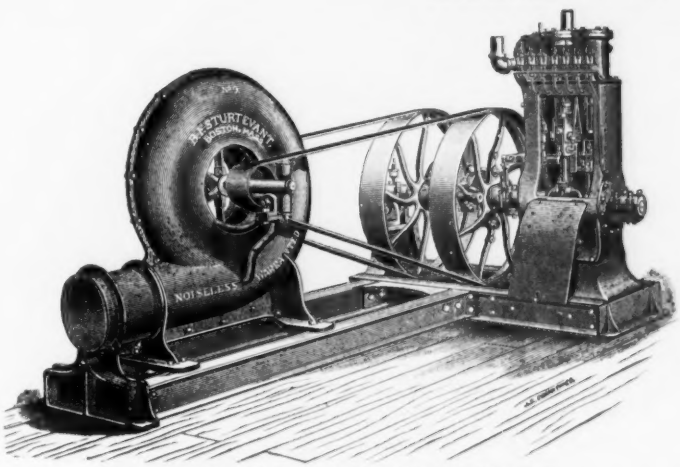
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors

Send for Catalogue.

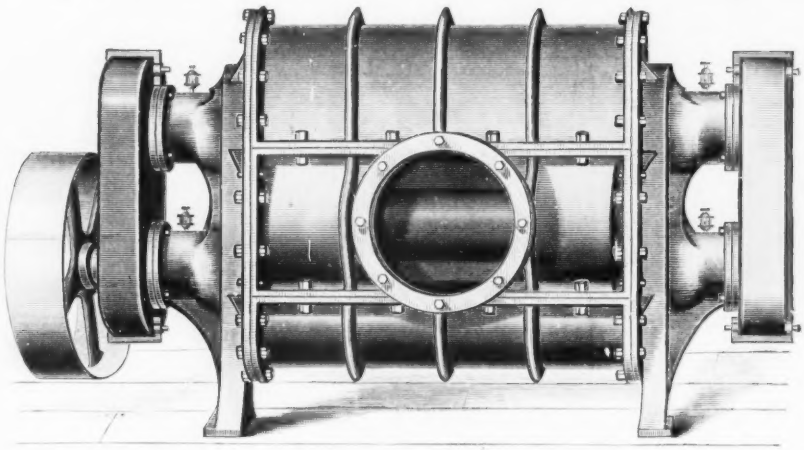
B. F. STURTEVANT CO.,

BOSTON, MASS.

131 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

STOCK CARRIED AT BRANCHES.

The Green Rotary Pressure Blower



Working parts are two perfectly balanced impellers, mounted on the best steel shafts, running in bronze bushes, cut gearing at both ends of the Blower enclosed in oil-tight casing.

Weighs less, occupies less space, costs less for freight than any other POSITIVE BLOWER in existance.

FOUNDRY BLOWERS

High Pressure Blowers

GAS EXHAUSTERS

Exhausters for Hot Gases

The GREEN Gives the Most Value for a $.

Wilbraham Baker Blower Co.,

2518 Frankford Ave., PHILADELPHIA, PA.

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$250,000.00
Youghiogheny Coal · High Grade Coke ·
INDIVIDUAL CARS.
DAWSON, PA.
N.P.HYNDMAN. Sales Agent
PITTSBURG PA

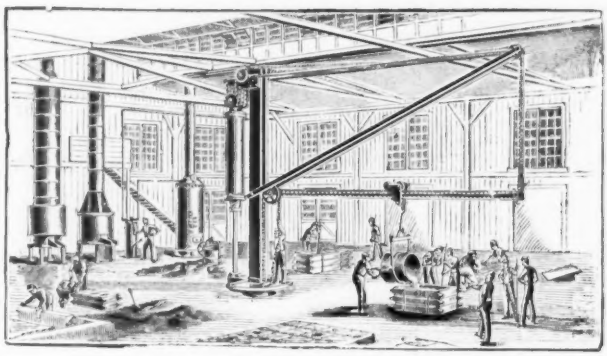
Wise Old Confucius Says:

"Is virtue a thing remote? I wish to be virtuous, and lo! virtue is at hand."

Which being translated:—

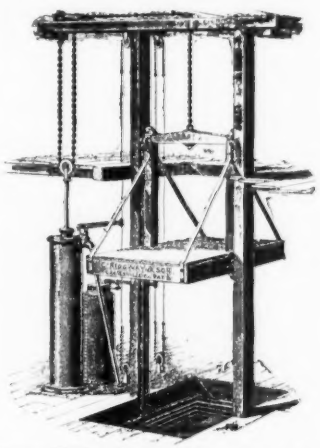
Is prosperity a thing remote? I wish to be prosperous, and lo! prosperity is at hand.

That is to say, all you have to do is to reach out your hand and take it. Yes, right in these hard times. Prosperity is still around, but you must be awake and alive to find her and seize her. And the best thing to grab her with is a Ridgway Crane.



5-ton Steam-Hydraulic Crane in a Foundry.

For instance, you are grumbling and growling because your plant don't seem to be making any money in these days of hard pan prices. No wonder. Your competitors are putting in machinery to save labor, and what are you doing? Now, just for fun, put on your hat and take a walk through your works and note the number of places you will find where a lot of men are moving stuff by hand or winding cranes. Oh, my, how slow!—don't it really make you tired to watch them? Now right there is your boiler full of steam—in all probability roaring to waste through your safety valve. Why in the name of Good Common Sense, man, don't you hook that steam right to your work, and with the pulling of a lever, do your lifting in the wink of an eye, and do it well, too.



Steam-Hydraulic Elevator, also made direct acting with cylinder under platform.

It's the little savings that count. A dollar here and a dollar there. Did you ever start out with a $10 bill. You came home "busted" and had nothing to show for your money. It went somehow or other—a nickel here, a quarter there. And so conversely as we save, we soon have our $10. In plants like yours, things are not done on the nickel and quarter basis, but the principle holds.

The Ridgway Crane is the machine right at your hand to change adversity to prosperity. We are making them in large numbers for the best plants right now. They are comparatively inexpensive and are a veritable Godsend to every establishment. If you will only take the trouble to look into it a little bit, you will want them as bad as the rest. The only reason you don't have them is because you are not awake to what is going on around you.

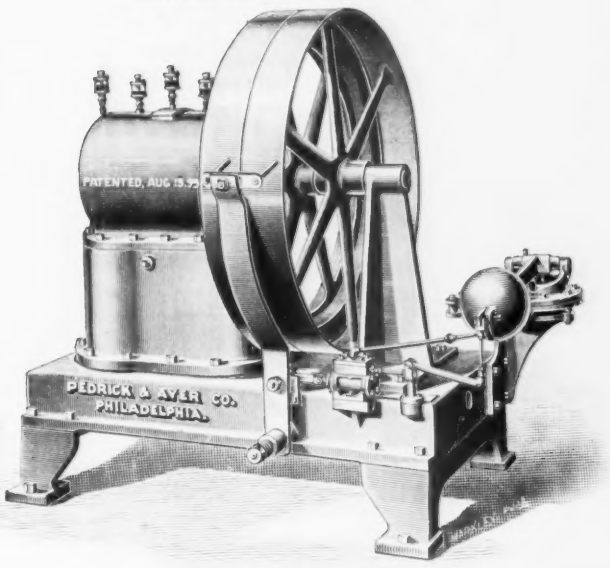
"PLEASE TAKE THE ELEVATOR."

Don't think of buying an elevator until you have gotten the prices of this one.

CRAIG RIDGWAY & SON, COATESVILLE, PA.

Automatic Compound Belt Air Compressors.

PATENTED AUGUST 13TH 1895.

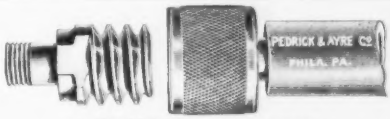


Straight Lift Hoist. **Built in two sizes, Nos. 1 and 2.**

No.	Size of Cylinders in inches	Revolutions per Minute.	Cubic Feet of Free Air	Horse Power Required.	Size of Pulleys in inches	Shipping Weight of Compressor	Floor Space in inches	Telegraphic Symbol
1	11x 6 6x 6	100-150	32 50	2-3½	40x5	2875 lbs.	60x40	Parian
2	1 x10 8x10	90-120	90-140	9-15	60x6	5370 lbs.	70x60	Parish

HORIZONTAL HOIST.

PAT. SEPT 4TH 1894.



AIR HOSE COUPLING

For ½ inch, ¾ inch and 1 inch Hose.

These Compressors will compress more air at less cost than any other make, requiring no attention other than oiling; entirely automatic in action, stopping and starting as air is required. Specially adapted for foundry use. Can be run in series, if so, no stoppage impossible.

Horizontal Air Lift for low ceilings: for general lifting, quick in action and under perfect control of operator.

Straight Air Lift for foundry purposes when equipped with retaining and releasing valve, will hold the load whether heavy or light, in the desired position, as in case of lifting a ladle of molten iron and pouring it or raising a flask to knock out the sand. It can neither ascend or decend as long as connected to air supply.

Air Hose Couplings are designed to do away with long lines of hose. By having suspended along the air line a number of hose equipped with this device, connections can instantly be made or disconnected, allowing one hoist to serve in several places. Each size made in duplicate. Containing a shut-off valve.

Send for circulars and details to Pedrick & Ayer Co., Pneumatic Department.

PEDRICK & AYER CO.

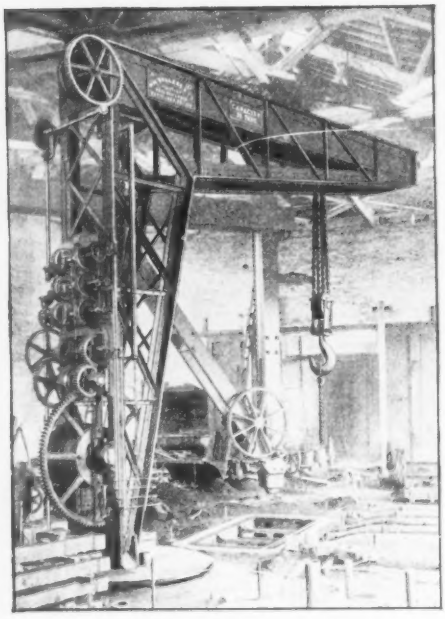
SPRING GARDEN STATION, PHILADELPHIA, PA.

Manning, Maxwell & Moore, *Sole Agents*, 111-113 Liberty St., New York City. 60 South Canal St., CHICAGO, ILL. 424 Telephone Bldg., PITTSBURG.

William Sellers & Co. Incorp.

PHILADELPHIA.

MODERN FOUNDRY MACHINERY



In connection with our Machine Tool Business, we conduct a large foundry where practical tests are continually made of new labor-saving devices. The manufacture of

IMPROVED FOUNDRY CRANES

has become an important feature.

The accompanying illustration shows a quick-acting 30-ton Steam Jib-Crane, erected in the foundry of J. Morton Poole Co., Wilmington, Del., superceding old wooden cranes, one of which appears in the background.

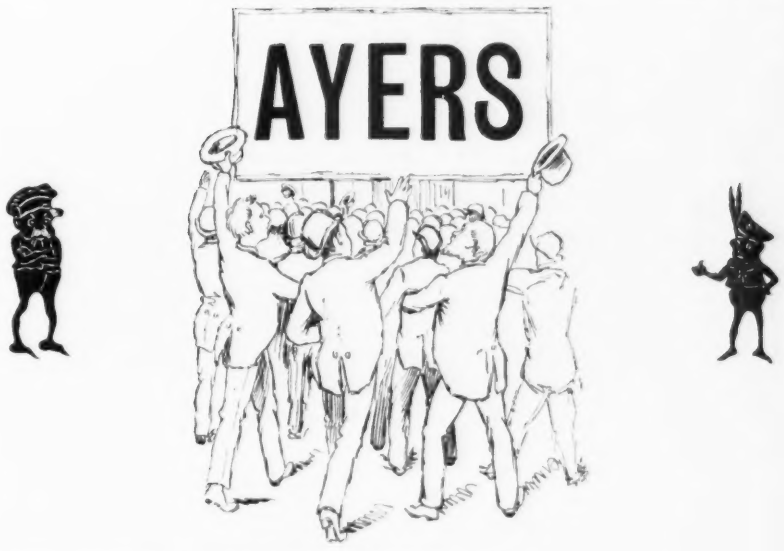
This crane is driven by independent 8" x 8" engines. The platform levers are near the floor. The effective radius of hook is 23 feet.

In future issues of this magazine, we will show illustrations of Jib and Traveling Cranes operated by electric motors.

Centrifugal Sand Mixer

Since the introduction and favorable reception of this effective, expeditious and economical **machine for preparing sand for molds and cores** we have simplified its construction and cheapened its cost. The capacity of the machine is remarkable, being limited only by the facilities for feeding sand into the hopper. Two men will easily shovel 5 tons an hour into the machine.

The qualities of "toughness" and "porosity" are materially improved by this process of preparing molding sand.



It is very common to find foundrymen cheering for

AYERS, the Sand Man!

Those who for the first time find a good molding sand are apt to show their happiness in this manner. . . . . .

Good Molding Sand

is the very foundation of good work; it is one of the greatest factors in cheap production. . . .

The Zanesville is the BEST!

The Different Grades of it will turn out Any Class of Work . . . . . .

ITS GOODNESS IS ONLY SURPASSED BY ITS CHEAPNESS.

E. M. AYERS ✻ MARKET BLOCK . . ZANESVILLE, OHIO.

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

15 Beekman Street, NEW YORK

Boston Office, 85 Water Street

F. A. GOODRICH & CO.

Incorporated

PIG IRON, STEEL, COKE, ETC.

Detroit, Mich.

MATTHEW ADDY & CO.

CINCINNATI, ST. LOUIS.

Agencies,

Chicago, Detroit, New York,

Philadelphia.

PICKANDS, BROWN & CO.,

Manufacturers, Importers and Dealers in

PIG IRON AND IRON ORE.

Rookery Building, CHICAGO.

THE DOMHOFF & JOYCE CO.

PIG IRON-COKE.

CINCINNATI.

CLINTON IRON & STEEL CO.

Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

PITTSBURG, PA

15 Cortlandt St., NEW YORK.

ROGERS, BROWN & CO.

CINCINNATI, CHICAGO,

BUFFALO,

PHILADELPHIA, NEW YORK,

ST. LOUIS

Powellton Coke

**Is Physically and Chemically equal—
in many respects superior—
to any Coke made.**

Its Ash and Sulphur, especially Ash, is much lower than the Standard Coke, whilst its Carbon is correspondingly increased. We guarantee it to be uniform and to give the very best results, and those who know us, know that our guarantee is good.

It is made up as follows:

Coke, 46.48 per cent.
Cells, 53.52 per cent.

We have no fear of contradiction

when we say that no other so closely approaches the ideal Coke, which has been found to be . . . . . .

Coke, 44.00 per cent.
Cells, 56.00 per cent.

The Cell Walls of the Coke

are bright and hard, and careful tests by eminent authorities have demonstrated that it will support, without crushing, a cupola charged fully 25 per cent. greater than the Standard Connellsville. . .

Don't you think it would pay you to try it.

Write for Prices, and Physical and Chemical Tests. References too, if you want them.

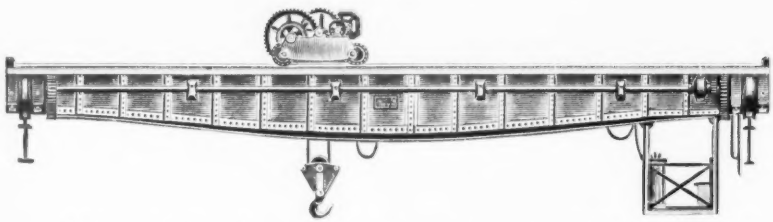
—

The Mount Carbon Company, Ltd.

POWELLTON, WEST VIRGINIA.

Whiting Foundry Equipment Co.

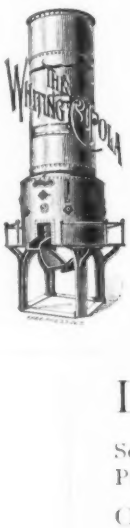
HARVEY, ILL. (Chicago Suburb.)



We gladly furnish estimates on CRANES for all purposes, operated by any power. Our prices and catalogue will interest you. Send particulars of your requirements.

THE WHITING CUPOLA.

14 SIZES.



THE STANDARD MELTER OF CAST IRON.

HIGHEST ECONOMY AND SPEED.

AIR HOISTS

Are becoming necessities in all plants that expect to meet competition.

LADLES

Send for Prices on

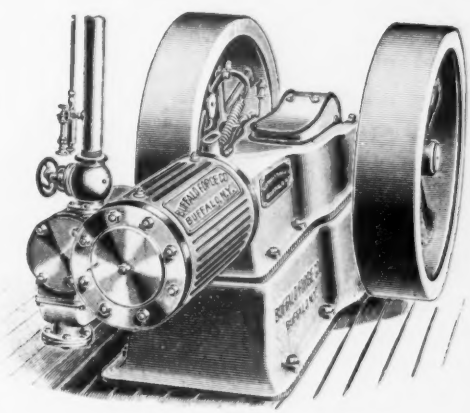
Our new Type PIN SPUR GEARED CRANE LADLE

We design and manufacture all kinds of Foundry Machinery. Will send Catalogue on request.

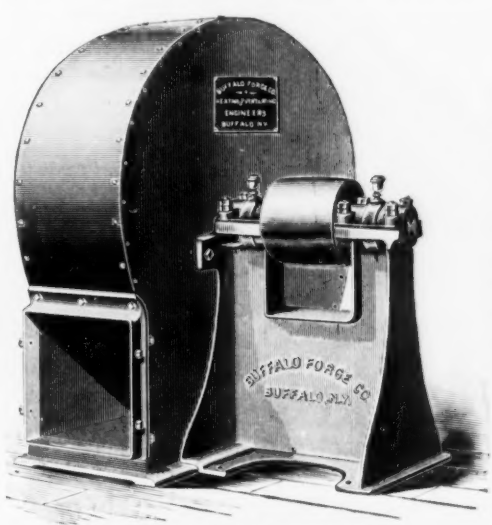
CUPOLA BLOWER

For the latest development in Cupola Blower construction and application, see BUFFALO FORGE CO.'S 1896 Sectional Catalogue, "America's Best, the World's Standard."

BUFFALO FORGE CO.'S Automatic Cut-off Engine, Horizontal and Upright types for Electric Lighting and Power purposes, direct connected or belted. 1896 Sectional Catalogue furnishes full details.



CLASS "A" HORIZONTAL.



TUMBLING BARREL EXHAUSTER.

Tumbling Barrel Exhausters are easily applied, thoroughly efficient, and change casting cleaning rooms from a death-dealing pestilence to a comfortable working apartment. Send for details.

BUFFALO FORGE CO.,
BUFFALO, N. Y., U. S. A.

CHICAGO, 22-24 W. Randolph St.
NEW YORK, 26 Cortlandt St.

"SYRACUSE" Steel Wheelbarrows

FOUNDRY BARROW

Ten Nos.

All dump forward and stand on end, saving room in storage. Best constructed and best balanced Barrow made.

The Tray is of best quality Steel, of uniform thickness save at corners, which are of double thickness, being smoothly lapped and riveted. The edges are rolled over a band of steel riveted under the flange. The Legs have renewable Steel Shoes. Patent Steel Wheel with Staggered Spokes. Heavily braced throughout. The most durable and easily handled Barrow made. Steel Charging and other Barrows in variety. Send for handsome Illustrated Barrow and Truck Catalogue No. 6

SYRACUSE CHILLED PLOW CO., Syracuse, N. Y.

Eberhardt's Patented Sprue or Gate Cutter

Dear Sir:—The machine fills the bill; am just delighted with it. Yours truly, Maryland Brass & Metal Works, Baltimore, Md.

Price Low

Send to

GOULD & EBERHARDT, NEWARK, N. J.

Look at the Wood We Burn into . . **CHARCOAL**

NO WONDER OUR

CHARCOAL FACING

is used in so many Brass and Stove Foundries.

LET US TALK IT OVER WITH YOU

Springfield Facing Co. SPRINGFIELD MASS.

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.75 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month, $20.00
Half page - - -	" 12.00
Quarter page - -	" 7.00

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements must be in by the 20th of the month preceding publication to insure insertion.

The Coburn Patent Trolley Track

PARLOR DOOR HANGERS.

The adjustment is in the Track and not in the Hanger, as are others.

☞Send for Book.

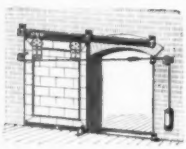
The Coburn Patent Trolley Track

BARN DOOR HANGERS.

Impssible for door to jump the track. Very simple and cheap to apply.

☞Send for Book.

The Coburn Patent Trolley Track



FIRE DOOR HANGERS.

Recommended and adopted by fire underwriters all over the United States.

☞Send for Book.

The Coburn Patent Trolley Track

Overhead Tramway

Furnished complete with straight and curved track, switches, frog brackets, single and double carriers.

☞Send for Book.

The Coburn Patent Trolley Track

—AND—

Patent Rolling Ladder Systems

Over 10,000 in use in the U. S. Roll suspended from ceiling or facing the shelves.

☞Send for Book.

The Coburn Trolley Track Mfg. Co.,

HOLYOKE, MASS.

GLUTROSE

(Trade Mark.)

The Universal Liquid Core Compound

Patented in the United States, England, France and Belgium.

GLUTROSE was invented and is manufactured by a practical foundryman of many years' experience, It has been used in the Pennsylvania Railroad Foundry at Altoona and other large foundries for the past three years with the most satisfactory results.

It is cheaper and better than rosin, oil or any other compound in use, and takes the place of all other materials and never varies in quality.

Makes the most difficult cores for iron or brass of any size.

The cores come out easily and leave the castings smooth.

Will let the air and gases off from a core which is difficult to vent better than any other material in use and makes no offensive smell or smoke.

WILL NEVER BLOW THE CASTINGS.

AMERICAN GLUTROSE WORKS

Sole Manufacturers.

OFFICE: PENN MUTUAL BUILDING,

No. 925 Chestnut St., Philadelphia.

Your Friend the....

Kenwood Bicycle

A Wheel You Can Depend Upon.

For Lightness, Swiftness and Strength it is Unsurpassed.

You can learn all about it by addressing

Hamilton Kenwood Cycle Co.

203-205-207 S.Canal St., Chicago.

BUYERS' DIRECTORY.

ALUMINUM.
Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.

AIR HOISTS.
Pedrick & Ayer, Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

AIR COMPRESSORS.
Pedrick & Ayer, Philadelphia, Pa.

BARREL TRUCKS.
The Adams Co., Dubuque, Ia.

BLOWERS.
Buffalo Forge Co., Buffalo, N. Y.
Connersville Blower Co., Connersville, Ind.
Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass.
Wilbraham Baker Blower Co., Philadelphia, Pa.

BRASS FOUNDERS' SUPPLIES.
Garden City Sand Co., Chicago.
J. W. Paxson Co., Philadelphia, Pa.

BRONZES.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

CHARCOAL.
J. W. Paxson Co., Philadelphia, Pa.
Springfield Facing Co., Springfield, Mass.

COKE.
Mount Carbon Co., Ltd., Powellton, W. Va.
Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
American Glutrose Works, Philadelphia, Pa.
J. W. Paxson Co., Philadelphia, Pa.
Vreeland Tompkins, Jersey City, N. J.

CORE OVENS.
J. W. Paxson Co., Philadelphia, Pa.
Millett Core Oven Co., Brightwood, Mass.

CRANES.
Craig, Ridgway & Son, Coatesville, Pa.
Wm. Sellers Co., Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

CRUCIBLES.
Garden City Sand Co., Chicago.
Joseph Dixon Crucible Co., Jersey City, N. J.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co. Robert J., Philadelphia, Pa.

CUPOLAS.
J. W. Paxson Co., Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

ELEVATORS.
Ridgway & Son, Craig, Coatesville, Pa.

FIRE-BRICK.
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J. W. Paxson Co., Philadelphia, Pa.
Obermayer Company, The S., Cincinnati, O.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.

FLASKS.
Diamond Clamp & Flask Co., Richmond., Ind.
J. W. Paxson Co., Philadelphia, Pa.

FLEXIBLE SHAFTS.
Stow Mfg. Co., Binghamton, N. Y.

FOUNDRY LADLES.
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Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.
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Whiting Foundry Equipment Co., Harvey, Ill.

FOUNDRY SUPPLIES.
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Springfield Facing Co., Springfield, Mass.
Whitehead Bros. Co., New York.

GRINDING MACHINERY.
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IRON BUILDINGS.
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Wrought Iron Bridge Company, Canton, O.

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Vreeland Tompkins, Jersey City, N. J.

MANGANESE AND SILICON.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

MOLDING MACHINES.
Henry E. Pridmore, Chicago, Ill.
J. W. Paxson Co., Philadelphia, Pa.
The Adams Co., Dubuque, Ia.
Tabor Mfg. Co., Elizabeth, N. J.

MOLDING SAND.
Ayers, E. M., Zanesville, Ohio.
Garden City Sand Co., Chicago, Ill.
J. W. Paxson Co., Philadelphia, Pa.
Whitehead Bros. Co., New York.

PHOSPHORUS.
Moro-Phillips Chemical Co., Philadelphia, Pa.

PATTERN MAKERS.
The Gobeille Pattern Co., Cleveland, Ohio.

PATTERN SHOP TOOLS.
Frank H. Clement Co., Rochester, N. Y.

PIG IRON.
Clinton Iron & Steel Co., Pittsburgh, Pa.
Superior Charcoal Iron Co., Detroit, Mich.

PNEUMATIC CHIPPING TOOLS.
Chicago Pneumatic Tool Co., Chicago, Ill.

PLUMBAGO.
Garden City Sand Co., Chicago.
Joseph Dixon Crucible Co., Jersey City, N. J.
J. S. McCormick Company, Pittsburg, Pa.
McCullough-Dalzell Co., Pittsburg, Pa.
Obermayer Company, The S., Cincinnati, O.
Paxson & Co., J. W. Philadelphia, Pa.
Smith Foundry Supply Co., Cincinnati, Ohio
Springfield Facing Co., Springfield, Mass.
Whitehead Bros. Co., New York.

SAND SIFTERS.
Gould & Eberhardt, Newark, N. J.
J. W. Paxson Co., Philadelphia, Pa.
Springfield Foundry Co., Springfield, Ohio.
Wm. Sellers & Co., Philadelphia, Pa.

SAND BLAST MACHINERY.
Ward & Nash, Chicago, Ill.

STEEL W[illegible] SUPPLIES AND STOPPER'
Joseph [illegible] Crucible Co., Jersey City, N. J.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co., Robert J., Philadelphia,

TROLLEY TRACKS.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.

TUMBLING BARRELS.
Gould & Eberhardt, Newark, N. J.
J. W. Paxson Co., Philadelphia, Pa.
Stover Mfg. Co., Freeport, Ill.
Whiting Foundry Equipment Co., Harvey, Ill.

WHEELBARROWS.
J. W. Paxson Co., Philadelphia, Pa.
Syracuse Chilled Plow Co., Syracuse, N. Y.

WIRE BRUSHES.
J. W. Paxson Co., Philadelphia, Pa.

WEIGHING MACHINES.
Garden City Sand Co., Chicago.

Do You Have Small Imperfections in Castings?

TRY TOMPKIN'S

"Smooth On" Castings Iron Compound.

ITS VALUE IS PROVED BY CONTINUED USE AND INCREASING SALES.

"SMOOTH ON" IRON T COMPOUND CASTINGS

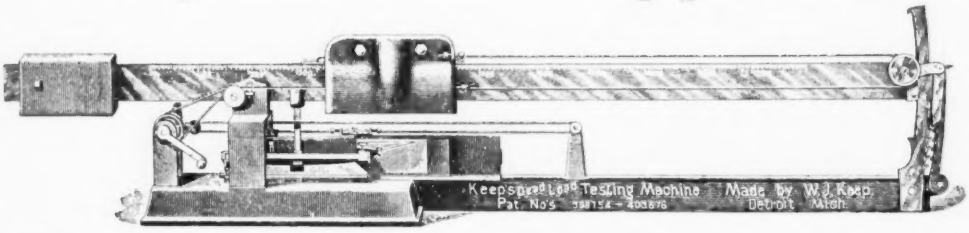
VREELAND TOMPKINS, Manufacturing and Analytical Chemist, 551 COMMUNIPAW AVE. JERSEY CITY, N. J.

In every foundry amounting to anything

You will find THE FOUNDRY and it is not a sample copy either. You look around and you will see the back numbers stored away for ready reference. They are looked over many times a month. Do you see the reason why . . . . . .

Advertising in THE FOUNDRY Pays?

"Keep's Test" Apparatus.



HERE IS WHAT ONE LARGE CONCERN SAYS:-IT HAS PAID THEM, WHY NOT YOU?

DETROIT, MICH., March 31st, 1896.

Mr. W. J. Keep, City:

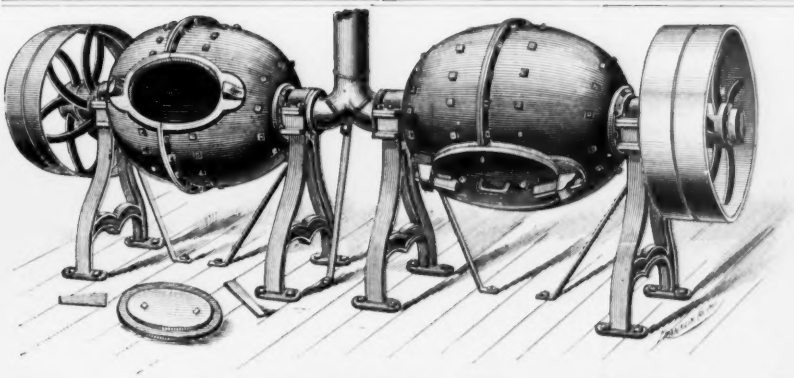
DEAR SIR: We have regulated our foundry mixture by "Keep's Test" during the past year, and can recommend it in highest terms. We know exactly what we are doing and can keep our castings of uniform quality. We find that .160 inches per foot the best shrinkage, and have been able to keep the average strength of a test bar ½ inch square and 12 inches long at 450 pounds.

Very truly yours,

LELAND & FAULCONER MFG. CO.,

H. M. LELAND, Vice-President.

TO SAVE MONEY IN YOUR OWN FOUNDRY, ADDRESS W. J. KEEP, Detroit, Mich.



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The Stover Egg Shaped Barrel does doublethe work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron wire nails, or any other small articles that require cleaning and polishing.

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Stover Manufacturing Co.

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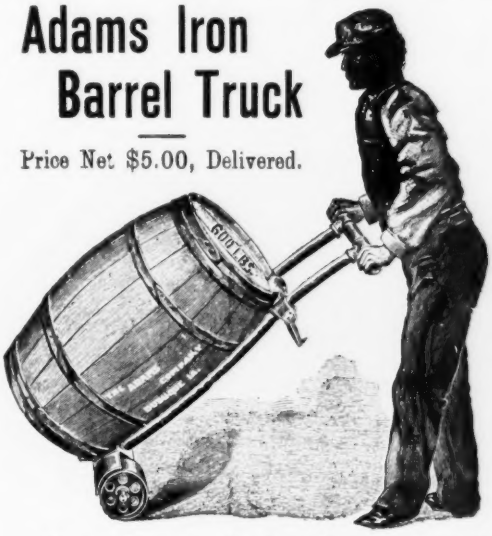
Price Net $5.00, Delivered.



One man can attach and move **heavily** loaded barrels, with or without heads, not touching the barrels with his hands.

More description furnished on application.

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THE ADAMS COMPANY. DUBUQUE, . . . IOWA.

ESTABLISHED 1854.

Brooklyn Fire Brick Works

CUPOLA BLOCKS, FIRE SAND, FIRE CLAY, FIRE MORTAR, KAOLIN

AND ALL FIRE MATERIAL REQUIRED FOR FOUNDRY PURPOSES.

Send for Illustrated Catalogue and Prices:

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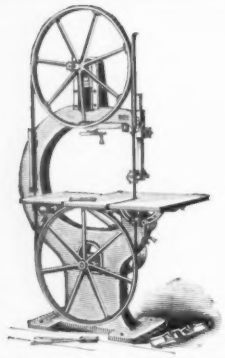

34 in. and 36 in. Band Saw Machine.

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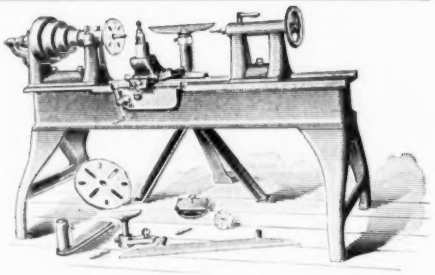

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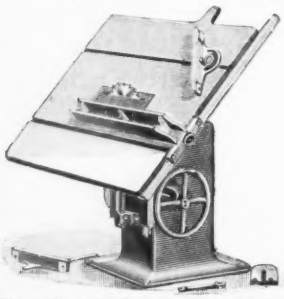

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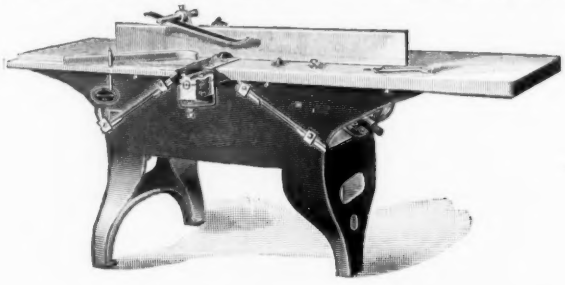

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When your cook doesn't suit

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A good thing always pushes itself along

E. C. LUFKIN, General Manager The Snow Steam Pump Works, Buffalo, N. Y., says: "We have a copy of 'Metallurgy of Cast Iron,' and consider it a very valuable work and believe that no iron founder can well afford to be without it. There is a great deal in the book which is exceedingly interesting and instructive, and we wish to congratulate the author upon having so thoroughly covered the subject."

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C. F. Blakesly, General Manager Du Quoin Iron Works Co., Du Quoin, Ill., says: "'Metallurgy of Cast Iron' should be in the hands of every progressive foundryman, and, in fact, every one who has to do with castings."

The Opinions of Three General Managers==Can we say more?

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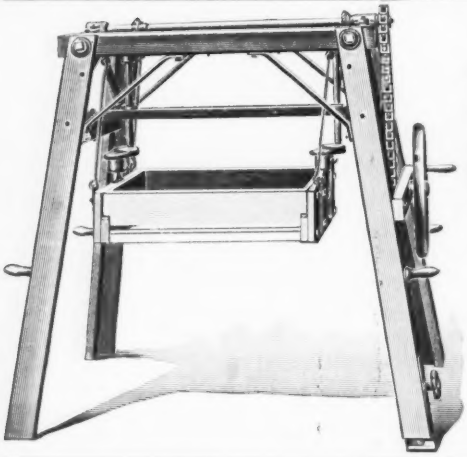
We are also prepared to furnish all Standard Works pertaining to the trade.



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This is the Best, Simplest, Cheapest, Most Durable and Most Easily Operated Sand Riddling Machine made.

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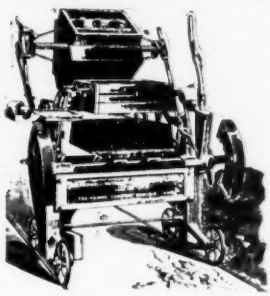

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You can hang your sign out

Some see it, more do not.

You can keep your "Ad" **in The Foundry**

And everybody sees it!

It is the only medium that reaches the Foundryman. Our foreign service is unexcelled.

ESTABLISHED 1853.

Guaranteed Pure . . . "AMERICAN PHOSPHORUS"

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Also
TIN FLUX,
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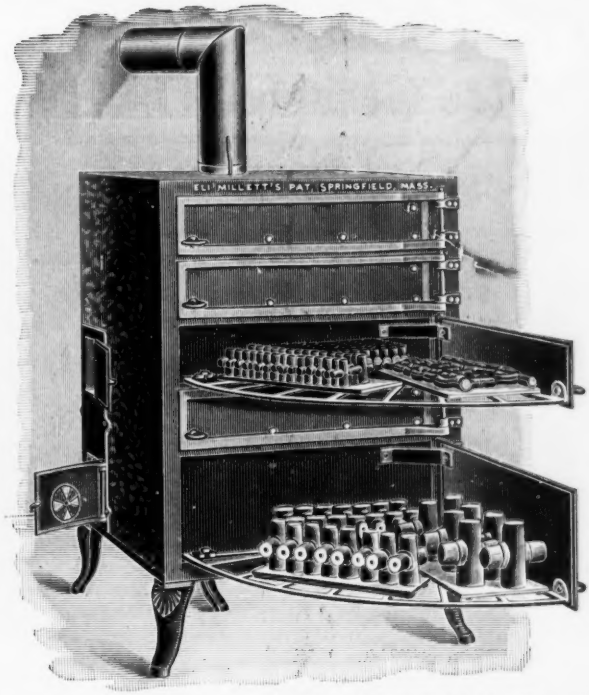

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THE BEST IN THE WORLD.

No Foundry using small Cores can afford to be without it.

Over one hundred and fifty in use.

Send for our new Catalogue giving names of those using them.

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FAST WORK AND DIAMOND SNAP FLASKS

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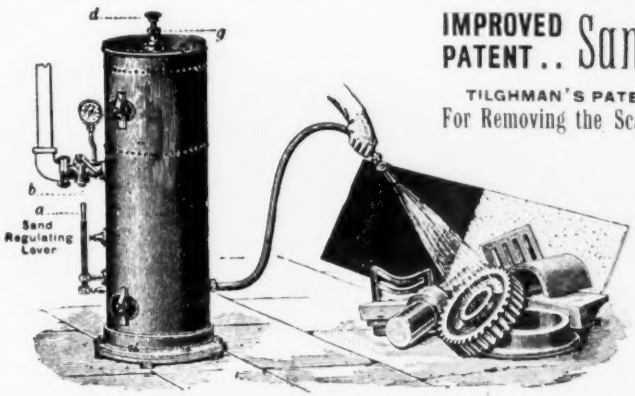

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TILGHMAN'S PATENTS MATHEWSON'S PATENTS.

For Removing the Scale from Iron and Steel Plates.

Cleaning Castings, Forgings, etc.

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All business connected with the sale of the above brands of Charcoal Pig Iron will, from April 1st, 1897, be handled by **The Superior Charcoal Iron Co.**, of Detroit, Mich., which is thus enabled to supply the best iron known for all purposes, and especially for Car Wheels, Malleable Castings, Boiler Tubes, Ship and Armor Plate, Strong High Silicon for Foundry purposes, Basic Iron with the minimum of Silicon and Sulphur, also Iron to take the place of Salisbury, Southern and Swedish Charcoal Iron.

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Why deal with Commission people or Agents who give fancy names to Irons and know nothing about their manufacture.

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HANGING ON BY THE TOE NAILS

That is what many a man is. Every Saturday that comes along he is shivering for fear that he will be told that there is nothing more for him to do. Are you one of these, brother? We know you are a law abiding citizen, you are well educated, that is in everything except the foundry business; strange, isn't it that the trade, by which you are earning your living, is the very one you know the least about. You are hanging on to your job by the toe nails. Do you want to get a better hold? Transfer a dollar to us through any medium you choose and we will see that THE FOUNDRY reaches you for twelve months. It will teach you something; you will get a stronger hold on your position and when anyone has to go it won't be you.

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FOUNDRY MOLDING MACHINES,
STRIPPING PLATE MACHINES,
PORTABLE, AIR-POWER, MACHINES,

USING WOOD OR METAL SPLIT PATTERNS, WITHOUT STRIPPING PLATES.

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Take the tool to the work and save heavy handling.

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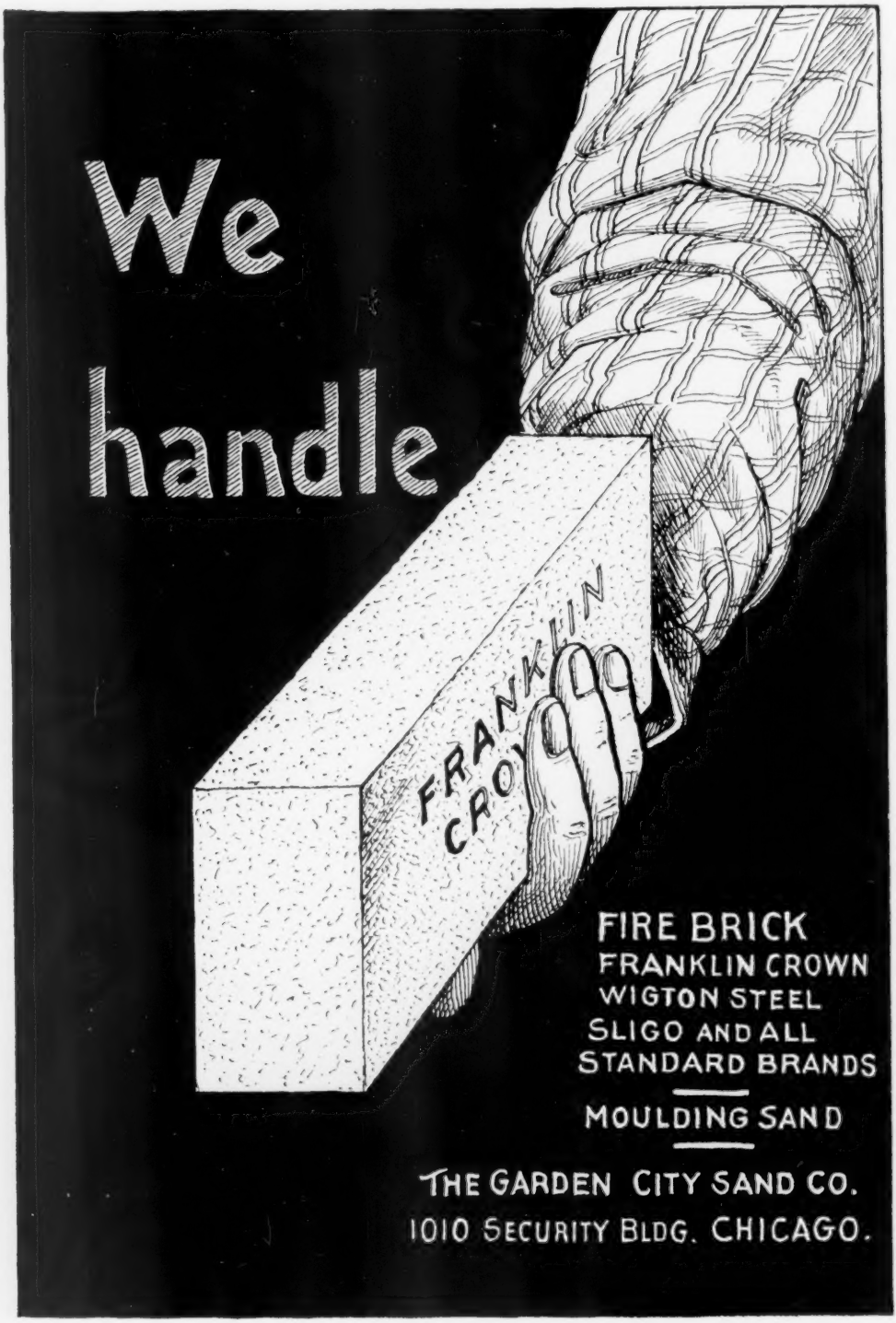
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The man who says that good times are gone forever, is going to be shoved over

The Brink of Prosperity

before long. The lane of hard times is getting close to a turn. Are you ready to go ahead? We have placed a great many new and improved articles on the market, to which we would like to introduce you at your own convenience. Keep posted and keep in front.

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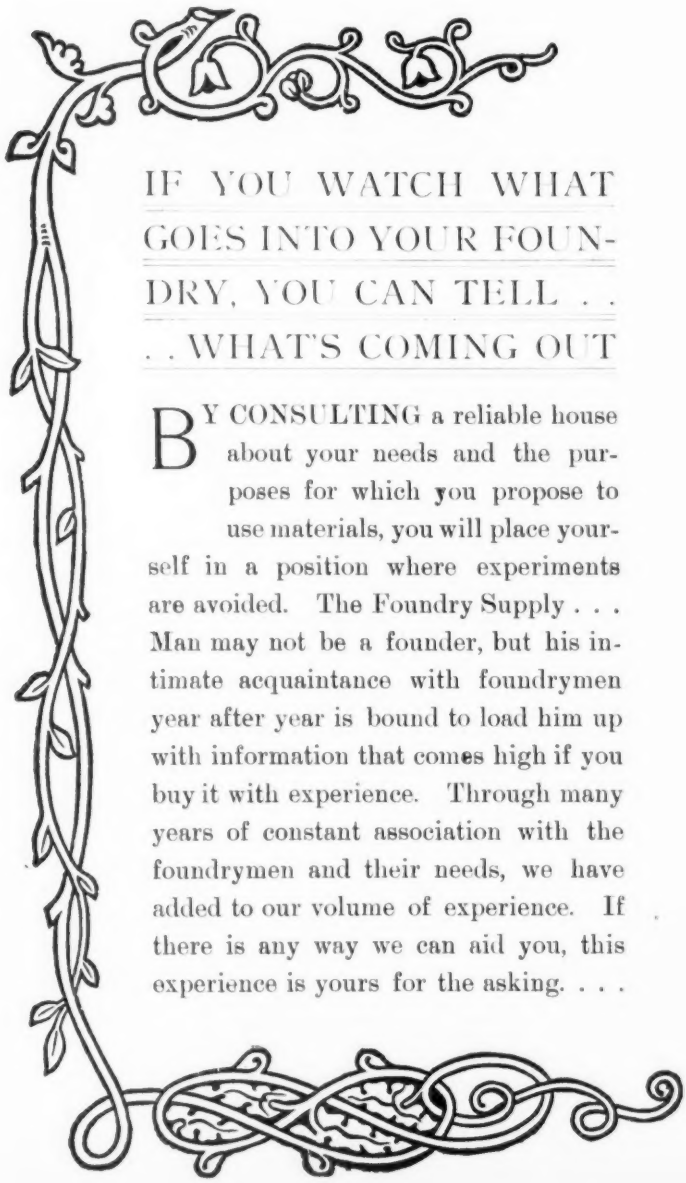

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BY CONSULTING a reliable house about your needs and the purposes for which you propose to use materials, you will place yourself in a position where experiments are avoided. The Foundry Supply . . . Man may not be a founder, but his intimate acquaintance with foundrymen year after year is bound to load him up with information that comes high if you buy it with experience. Through many years of constant association with the foundrymen and their needs, we have added to our volume of experience. If there is any way we can aid you, this experience is yours for the asking. . . .

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as to

Joseph Dixon Invented the Plumbago Crucible

DATE OF INVENTION
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Dixon's Crucibles have been in the Market SEVENTY YEARS.

Dixon's Plumbago Crucibles

Dixon's Crucibles are Standard all over the GLOBE.
Dixon's Crucibles are used in every country on the Globe where metals are melted.
Dixon's Crucibles have the highest records for HEATS.
Dixon's Crucibles are made to get

BEST RESULTS WITH THE LEAST COAL.

Dixon's Crucibles are made of many mixtures to suit all kinds of work.
Dixon's Crucibles are made special for Steel Melting.
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In ordering you will be benefitted by mentioning the kind of Metals melted. Write for pamphlet **"How to Use Plumbago Crucibles."** The best are the cheapest, as they must stand the punishment of high heat and much wear and tear. The "Dixon" records in average efficiency, in general good behaviour and in volume of sales, far in the lead.

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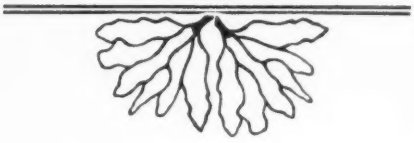

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FIRE CLAY, KAOLIN,
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OF ALL KINDS.
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A SPECIALTY.

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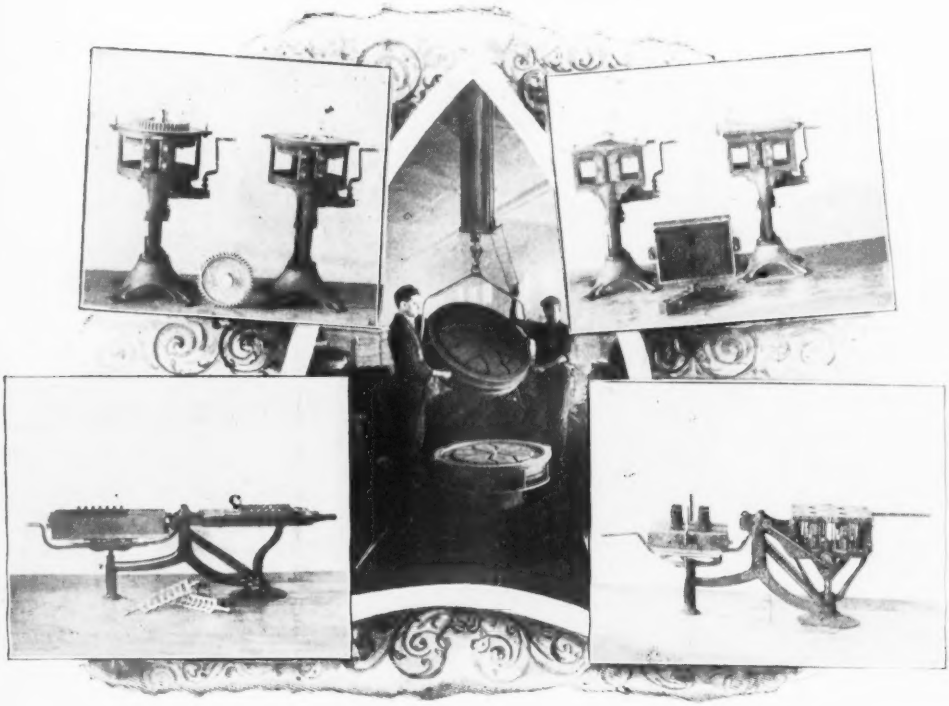
FOR ALL CLASSES OF WORK.

STRAIGHT DRAW, ROCKOVER, AUTOMATIC DRAW ROCKOVER,
IN OVER TWENTY DIFFERENT SIZES.



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INSURE BETTER AND MORE UNIFORM CASTINGS.
LESSEN COST OF MACHINE WORK ON CASTINGS.
LIGHTEN THE LABOR AND SIMPLIFY FOUNDRY METHODS.
SAVE FIFTY TO SEVENTY-FIVE PER CENT.

Those having Grey Iron or Brass Castings to make in reasonable quantities, will do well to write for full information and lists of many foundries now using these machines. Estimates, prices, terms, etc., will be promptly furnished. Rights to use these machines for Malleable Iron and Steel Castings are reserved. Address,

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ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

Iron and Steel Bridges, Roofs and Buildings.

The above illustration, taken direct from a photograph, shows the interior of an Iron Foundry designed and built by us for the Farrel Foundry & Machine Company, at Ansonia, Conn. The building is 129 feet in width by 302 feet in length. The wings are 30 feet and 43 feet respectively, and the central portion is 56 feet in width. The central portion of the building is controlled by a hydraulic traveling crane, with a travel the full length of the building, and is also arranged with jib cranes for delivering material from the traveling crane to the cranes in the wing trusses.

Office and Works, - - EAST BERLIN, CONN.

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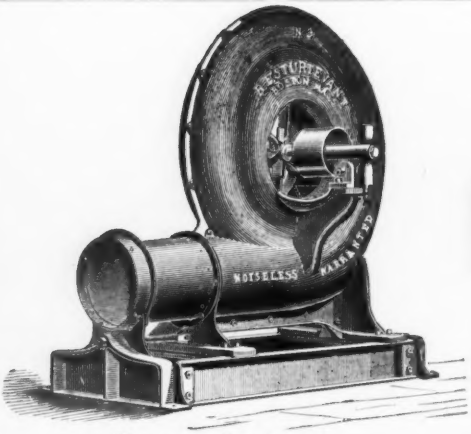


Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

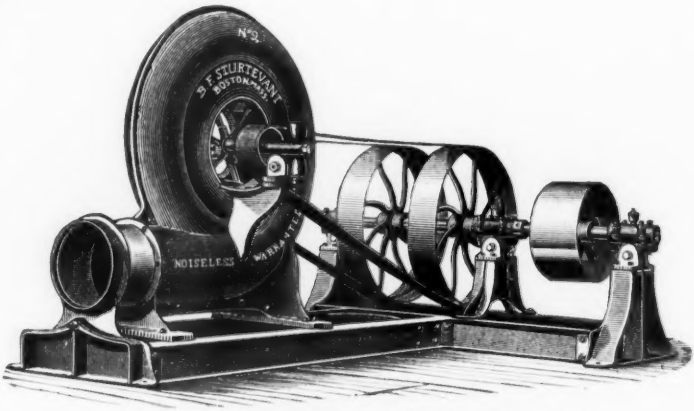
—FOR—

Cupola Furnaces and Forge Fires.

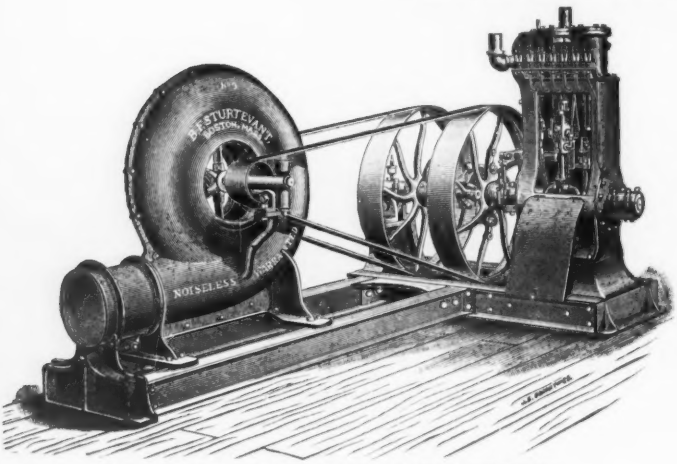
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

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Direct Connected

Electric Motors

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131 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
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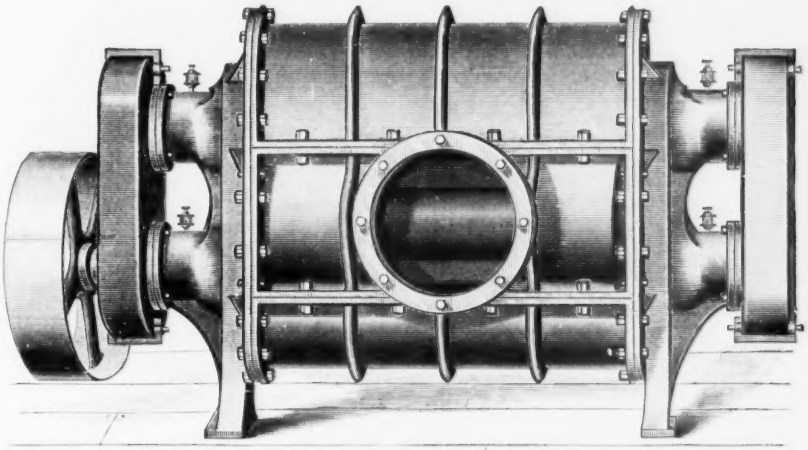
STOCK CARRIED AT BRANCHES.

The Green Rotary Pressure Blower



Working parts are two perfectly balanced impellers, mounted on the best steel shafts, running in bronze bushes, cut gearing at both ends of the Blower enclosed in oil-tight casing.

Weighs less, occupies less space, costs less for freight than any other POSITIVE BLOWER in existance.

FOUNDRY BLOWERS

High Pressure Blowers

GAS EXHAUSTERS

Exhausters for Hot Gases

The GREEN Gives the Most Value for a $.

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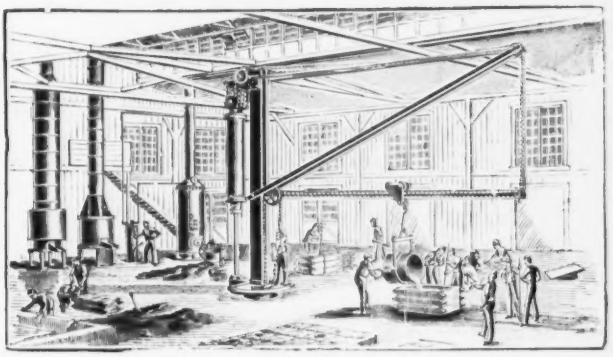
When it comes to hitching up Steam or Compressed Air to your work.

For example, there is our . . .

Steam-Hydraulic Crane



5-ton Steam-Hydraulic Crane in a Foundry.

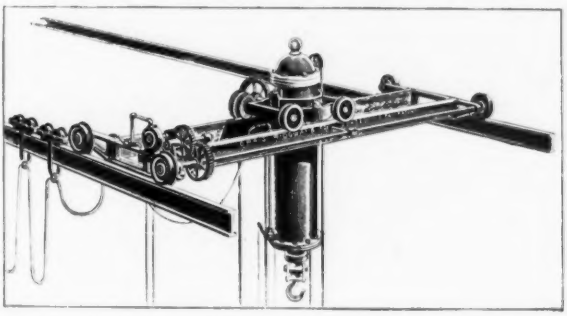
Is there, to your knowledge, any other crane which for a minute can compare with it? The great chorus of hundreds of users yell "NO!"

When men see this magnificent machine doing the most exacting work rapidly, beautifully and without noise, they feel like taking their hats off to it. Hence right through all these dull times we are constantly making them for the best shops and mills all over the land And you ought to hear these users talk about them. Reckon it would open your eyes a little.

If you have a steam boiler and heavy stuff to handle, you certainly are a foolish man if you don't look into this crane.

THEN THERE IS OUR OIL GOVERNED AIR HOIST.

No more jerkiness. No more Air Gun business. The most striking improvement ever made in Air Hoists. A quart or two of oil put in the piston rod and the wild, erratic air is tamed and made as gentle as the Steam-Hydraulic.



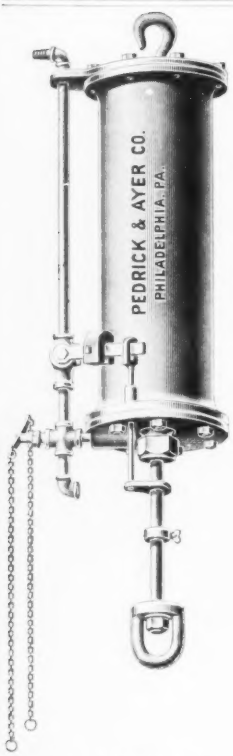
What a boon to foundrymen this is! What a machine to turn over to a gang of day laborers—can't hurt themselves or machine—and a quart or two of oil makes the perfection of it. Is it any wonder that every man who uses air hoists wants the Ridgway Oil Controlled Hoists?

In a brief card like this we can't tell much about this ideal air hoist, but our literature will explain it to you and you will not read very much of it before you will exclaim, "By jing! Ridgway, you certainly have made the air hoist a perfect machine!" We want people to know all about these machines. So write us unreservedly. We won't send a man to bother you simply because you make an inquiry. If you want to see us, you will send for us. We don't buttonhole people to buy our machines.

"PLEASE TAKE THE ELEVATOR."

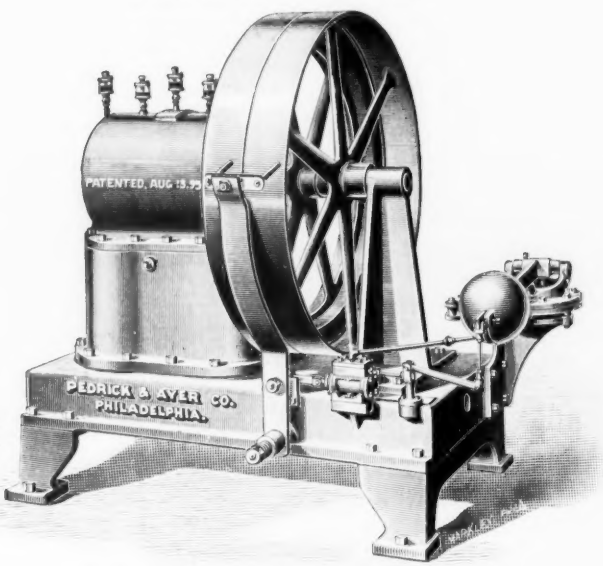
Even if there is no cut of it this week.
Our circular has a better cut anyhow.

CRAIG RIDGWAY & SON, COATESVILLE, PA.



Automatic Compound Belt Air Compressors.

PATENTED AUGUST 13TH 1895.



Straight Lift Hoist. **Built in two sizes, Nos. 1 and 2.**

No.	Size of Cylinders in inches	Revolutions per Minute.	Cubic Feet of Free Air	Horse Power Required.	Size of Pulleys in inches	Shipping Weight of Compressor	Floor Space in inches	Telegraphic Symbol
1	11X 6 6X 6	100-100	32- 50	2-3½	40x5	2875 lbs.	60x40	Parian
2	1 X10 8X10	90-120	90-140	9-15	60x6	5370 lbs.	70x60	Parish

HORIZONTAL HOIST.

PAT. SEPT 4TH 1894.

AIR HOSE COUPLING

For ½ inch, ¾ inch and 1 inch Hose.

These Compressors will compress more air at less cost than any other make, requiring no attention other than oiling; entirely automatic in action, stopping and starting as air is required. Specially adapted for foundry use. Can be run in series, if so, no stoppage impossible.

Horizontal Air Lift for low ceilings; for general lifting, quick in action and under perfect control of operator.

Straight Air Lift for foundry purposes when equipped with retaining and releasing valve, will hold the load whether heavy or light, in the desired position, as in case of lifting a ladle of molten iron and pouring it or raising a flask to knock out the sand. It can neither ascend or decend as long as connected to air supply.

Air Hose Couplings are designed to do away with long lines of hose. By having suspended along the air line a number of hose equipped with this device, connections can instantly be made or disconnected, allowing one hoist to serve in several places. Each size made in duplicate. Containing a shut-off valve.

Send for circulars and details to Pedrick & Ayer Co., Pneumatic Department.

PEDRICK & AYER CO.

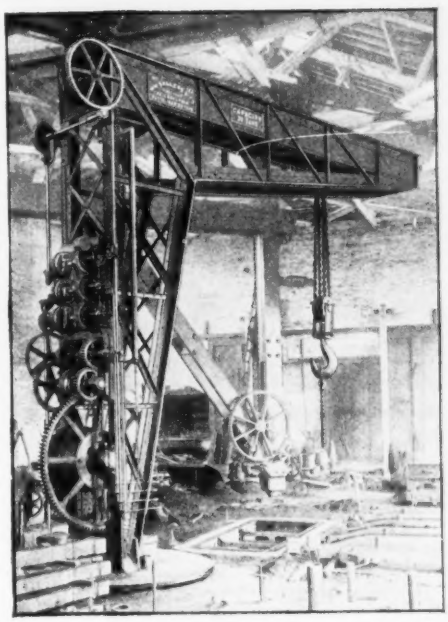
SPRING GARDEN STATION, PHILADELPHIA, PA.

Manning, Maxwell & Moore, *Sole Agents*, 111-113 Liberty St., New York City. 60 South Canal St., CHICAGO, ILL. 424 Telephone Bldg., PITTSBURG.

William Sellers & Co., Incorp.

PHILADELPHIA.

MODERN FOUNDRY MACHINERY



In connection with our Machine Tool Business, we conduct a large foundry where practical tests are continually made of new labor-saving devices. The manufacture of

IMPROVED FOUNDRY CRANES

has become an important feature.

The accompanying illustration shows a quick-acting 30-ton Steam Jib-Crane, erected in the foundry of J. Morton Poole Co., Wilmington, Del., superceding old wooden cranes, one of which appears in the background.

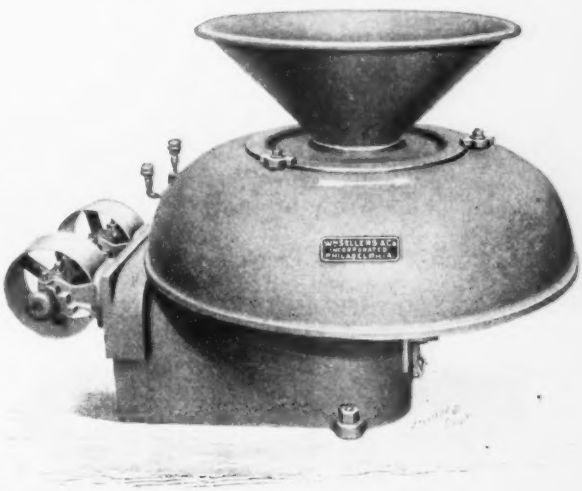
This crane is driven by independent 8" x 8" engines. The platform levers are near the floor. The effective radius of hook is 23 feet.

In future issues of this magazine, we will show illustrations of Jib and Traveling Cranes operated by electric motors.

Centrifugal Sand Mixer

Since the introduction and favorable reception of this effective, expeditious and economical **machine for preparing sand for molds and cores** we have simplified its construction and cheapened its cost. The capacity of the machine is remarkable, being limited only by the facilities for feeding sand into the hopper. Two men will easily shovel 5 tons an hour into the machine.

The qualities of "toughness" and "porosity" are materially improved by this process of preparing molding sand.



It is very common to find foundrymen cheering for

AYERS, the Sand Man!

Those who for the first time find a good molding sand are apt to show their happiness in this manner. . . . . .

Good Molding Sand

is the very foundation of good work; it is one of the greatest factors in cheap production. . . .

The Zanesville is the BEST!

The Different Grades of it will turn out Any Class of Work . . . . . .

ITS GOODNESS IS ONLY SURPASSED BY ITS CHEAPNESS.

E. M. AYERS ✳ MARKET BLOCK . . ZANESVILLE, OHIO.

Powellton Coke

**Is Physically and Chemically equal—
in many respects superior—
to any Coke made.**

Its Ash and Sulphur, especially Ash, is much lower than the Standard Coke, whilst its Carbon is correspondingly increased. We guarantee it to be uniform and to give the very best results, and those who know us, know that our guarantee is good.

It is made up as follows:

Coke, 46.48 per cent.
Cells, 53.52 per cent.

We have no fear of contradiction

when we say that no other so closely approaches the ideal Coke, which has been found to be . . . . . .

Coke, 44.00 per cent.
Cells, 56.00 per cent.

The Cell Walls of the Coke

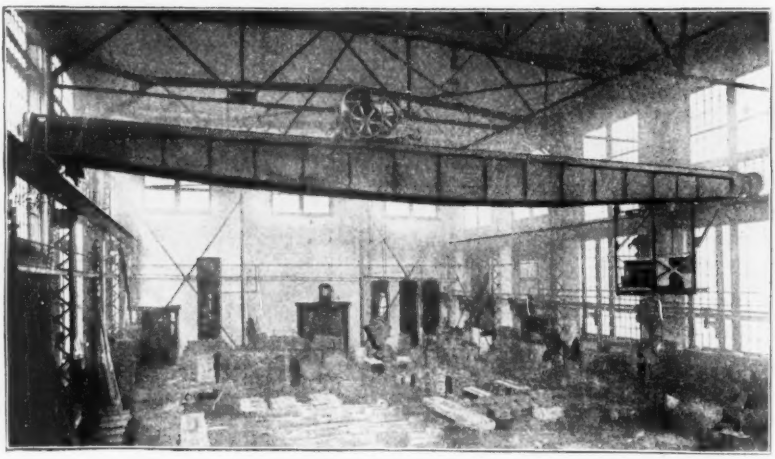
are bright and hard, and careful tests by eminent authorities have demonstrated that it will support, without crushing, a cupola charged fully 25 per cent. greater than the Standard Connellsville. . .

Don't you think it would pay you to try it.

Write for Prices, and Physical and Chemical Tests. References too, if you want them.

The Mount Carbon Company, Ltd.

POWELLTON, WEST VIRGINIA.

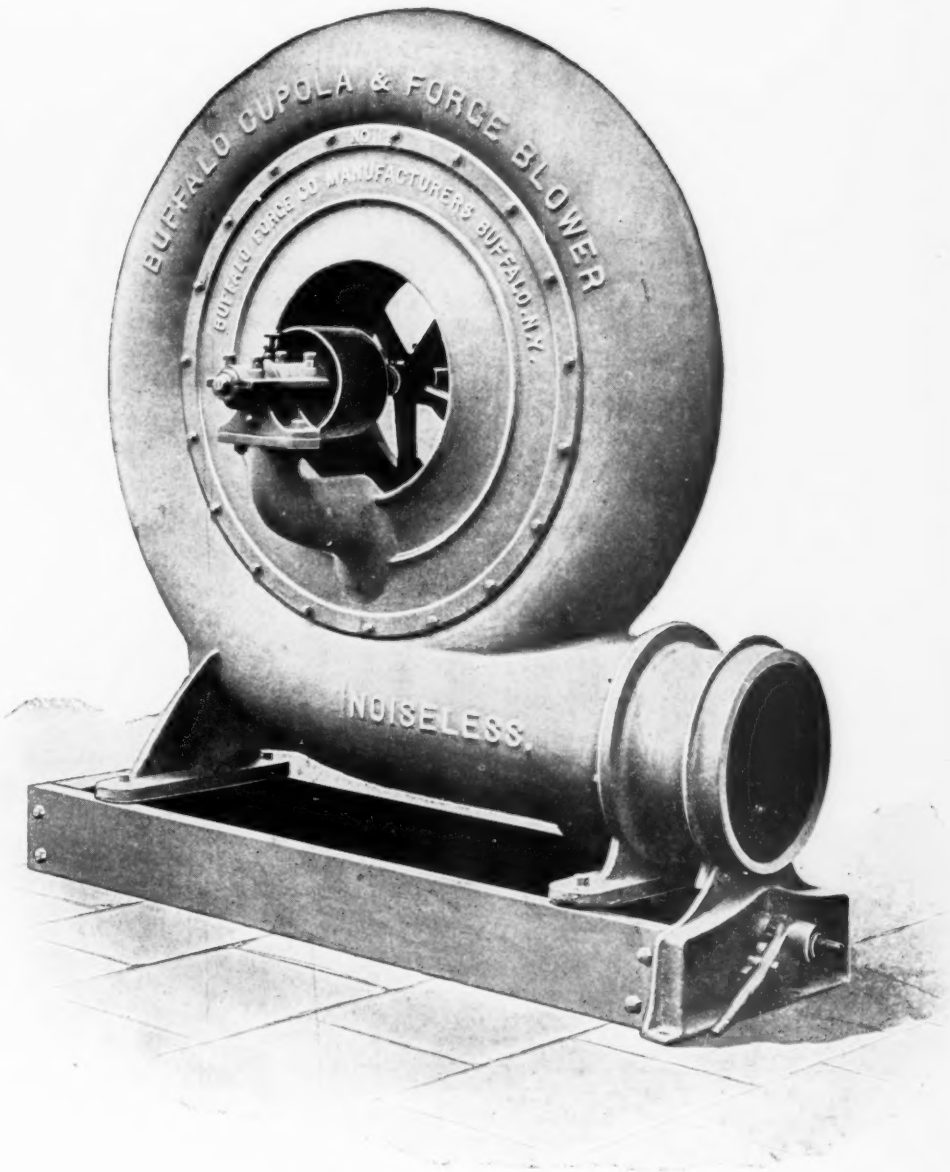


One of our Three Motor Electric Traveling Cranes is shown in the above cut. We also make Three Motor Compressed Air Cranes of the same general design. Both types give a full lift from floor to rail. The speeds are widely varied. The load is automatically held at any point, and is handled positively and with the utmost delicacy. Write for estimates. We supply other types, too—Jib, Locomotive, Gantry, etc., Hand Power, Steam, Air or Electric.

Whiting Foundry Equipment Co.

HARVEY, ILL. (Chicago Suburb.)

CUPOLAS, LADLES, AIR HOISTS, TRUCKS, Etc.



A BUFFALO BLOWER—ENOUGH SAID.

You have gone far enough

in your old way of making Cores!

Just stop and figure out how many times you have to make a complicated Casting over. You've some on the floor now.

What is the reason you can't make a good casting the first time, as soon as there are a few cores in it? Cores broke, eh? Cores blowed, did they? Vent wasn't large enough?

Well, then, poor core work is the cause of your greatest loss. Here is a sample of the kind of cores turned out by **OUR Core Compound.**

The above cut represents an intricate core made with our core compound without venting.

Wouldn't you have a dickens of a time making this core with the old flour mixture? Ten to one that the iron leaked into a vent some place and spoiled your day's work.

We make port cores, valve cores and the like, and all specially intricate cores every day in the year without a vent.

And say, you know how your cores stick in the casting. Can't get them out. Just seem to be baked in there as hard as the iron itself. Make your cores with **OUR Compound,** and watch the difference. (Cores made with it do not require to be blackened).

OUR Core Compound will go further than any linseed oil and cost less.

HOLLAND LINSEED OIL CO. 683 Holland Avenue CHICAGO, ILL.

"SYRACUSE" Steel Wheelbarrows

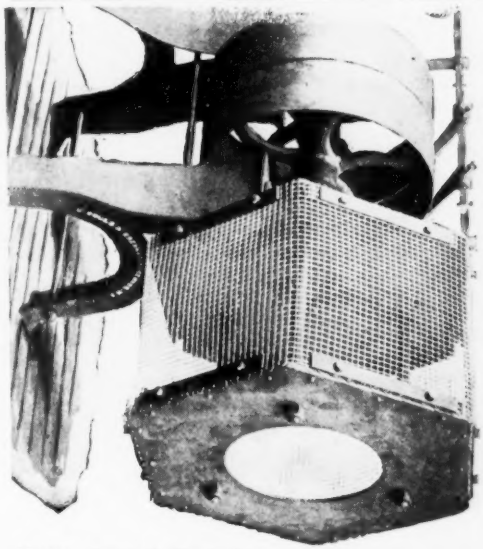
FOUNDRY BARROW

Ten Nos.

All dump forward and stand on end, saving room in storage. Best constructed and best balanced Barrow made.

The Tray is of best quality Steel, of uniform thickness save at corners, which are of double thickness, being smoothly lapped and riveted. The edges are rolled over a band of steel riveted under the flange. The Legs have renewable Steel Shoes. Patent Steel Wheel with Staggered Spokes. Heavily braced throughout. The most durable and easily handled Barrow made. Steel Charging and other Barrows in variety. Send for handsome Illustrated Barrow and Truck Catalogue No. 6

SYRACUSE CHILLED PLOW CO., Syracuse, N. Y.



Messrs, Gould & Eberhrdt:

NEWARK, N J. Aug. 19, 1896.

GENTLEMEN:—I have two of your Sand Sifters in use, and find them an excellent device for the preparation of Core and Facing Sand, as they sift and mix thoroughly, run with small amount of power, save the labor of one man even when run intermittently, and require but little care to keep in order. The finer seive is used as a dry Sifter and Mixer, the coarser one as a Mixer after the material is wet down. Yours truly,

S. J. MEEKER.

GOULD & EBERHARDT, NEWARK, N. J.

Look at the Wood We Burn into . . **CHARCOAL**

NO WONDER OUR

CHARCOAL FACING

is used in so many Brass and Stove Foundries.

LET US TALK IT OVER WITH YOU.

Springfield Facing Co. SPRINGFIELD MASS

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THE FOUNDRY

The only foundry paper published in the world, and an authority on all matters pertaining to the foundry business.

RATES OF SUBSCRIPTION.

Single subscription to all parts of the United States and Canada, $1 per annum.
" " Universal Postal Union, 1.75 "
Eight or more subscriptions at one time, 75 cents each.

ADVERTISING RATES.

One page - -	per month, $20.00
Half page - - -	" 12.00
Quarter page - -	" 7.00

When space is specified an extra charge of five per cent. on the above figures will be made. All pages between front cover and reading matter reserved for whole page advertisements.

Advertisers in THE FOUNDRY have the privilege of discontinuing their advertisements at any time after they have had three insertions, and will only be charged pro rata for the number of insertions printed. They also have the privilege of changing advertisements as often as desired.

The publishers of THE FOUNDRY appreciate the fact that it is customary for publications, especially the class known as Trade Journals, to quote a rate for advertising from which greater or less discounts are given, according to the persistency of the advertiser. This system is manifestly unfair as tending to show partiality. We have deducted the usual discount before quoting rates thus giving it to all alike, and no reduction of any sort on the above rates can be made.

Copy for advertisements must be in by the 20th of the month preceding publication to insure insertion.

The Coburn Patent Trolley Track

PARLOR DOOR HANGERS.

The adjustment is in the Track and not in the Hanger, as are others.

☞Send for Book.

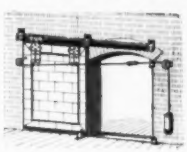
The Coburn Patent Trolley Track

BARN DOOR HANGERS.

Impossible for door to jump the track. Very simple and cheap to apply.

☞Send for Book.

The Coburn Patent Trolley Track



FIRE DOOR HANGERS.

Recommended and adopted by fire underwriters all over the United States.

☞Send for Book.

The Coburn Patent Trolley Track

Overhead Tramway

Furnished complete with straight and curved track, switches, frog brackets, single and double carriers.

☞Send for Book.

The Coburn Patent Trolley Track

—AND—

Patent Rolling Ladder Systems

Over 10,000 in use in the U. S. Roll suspended from ceiling or facing the shelves.

☞Send for Book.

The Coburn Trolley Track Mfg. Co.,

HOLYOKE, MASS.

GLUTROSE

(Trade Mark.)

The Universal Liquid Core Compound

Patented in the United States, England, France and Belgium.

GLUTROSE was invented and is manufactured by a practical foundryman of many years' experience. It has been used in the Pennsylvania Railroad Foundry at Altoona and other large foundries for the past three years with the most satisfactory results.

It is cheaper and better than flour, rosin, oil or any other compound in use; takes the place of all other materials and never varies in quality.

Makes the most difficult cores for iron or brass of any size.

The cores come out easily and leave the castings smooth.

Will let the air and gases off from a core which is difficult to vent better than any other material in use and makes no offensive smell or smoke.

WILL NEVER BLOW THE CASTINGS.

AMERICAN GLUTROSE WORKS

Sole Manufacturers.

OFFICE: PENN MUTUAL BUILDING,

No. 925 Chestnut St., Philadelphia.

Your Friend the....

Kenwood Bicycle

A Wheel You Can Depend Upon.

For Lightness, Swiftness and Strength it is Unsurpassed.

You can learn all about it by addressing

Hamilton Kenwood Cycle Co.

203-205-207 S. Canal St., Chicago.

BUYERS' DIRECTORY.

ALUMINUM.
Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.

AIR HOISTS.
Pedrick & Ayer, Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

AIR COMPRESSORS.
Pedrick & Ayer, Philadelphia, Pa.

BLOWERS.
Buffalo Forge Co., Buffalo, N. Y.
Connersville Blower Co., Connersville, Ind.
Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass.
Wilbraham Baker Blower Co., Philadelphia, Pa.

BRASS FOUNDERS' SUPPLIES.
Estate of Oscar Barnett, Newark, N. J.
Garden City Sand Co., Chicago.
J. W. Paxson Co., Philadelphia, Pa.

BRONZES.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

CHARCOAL.
J. W. Paxson Co., Philadelphia, Pa.
Springfield Facing Co., Springfield, Mass.

COKE.
Mount Carbon Co., Ltd., Powellton, W. Va.
Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
American Glutrose Works, Philadelphia, Pa.
Estate of Oscar Barnett, Newark, N. J.
Holland Linseed Oil Co., Chicago.
J. W. Paxson Co., Philadelphia, Pa.
Vreeland Tompkins, Jersey City, N. J.

CORE OVENS.
J. W. Paxson Co., Philadelphia, Pa.
Millett Core Oven Co., Brightwood, Mass.

CRANES.
Craig, Ridgway & Son, Coatesville, Pa.
Wm. Sellers Co., Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

CRUCIBLES.
Garden City Sand Co., Chicago.
Joseph Dixon Crucible Co., Jersey City, N. J.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co. Robert J., Philadelphia, Pa.

CUPOLAS.
J. W. Paxson Co., Philadelphia, Pa.
Whiting Foundry Equipment Co., Harvey, Ill.

ELEVATORS.
Ridgway & Son, Craig, Coatesville, Pa.

FIRE-BRICK.
Brooklyn Fire Brick Works, Brooklyn, N. Y.
Garden City Sand Co., Chicago.
J. W. Paxson Co., Philadelphia, Pa.
Obermayer Company, The S., Cincinnati, O.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.

FLASKS.
Diamond Clamp & Flask Co., Richmond., Ind.
Estate of Oscar Barnett, Newark, N. J.
J. W. Paxson Co., Philadelphia, Pa.

FLEXIBLE SHAFTS.
Stow Mfg. Co., Binghamton, N. Y.

FOUNDRY LADLES.
J. W. Paxson Co., Philadelphia, Pa.
Obermayer Company, The S., Cincinnati, O.
Smith Foundry Supply Company, The J. D., Cincinnati, Ohio.
Whitehead Bros. Co., New York.
Whiting Foundry Equipment Co., Harvey, Ill.

FOUNDRY PLANS.
Whiting Foundry Equipment Co., Harvey, Ill.

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Garden City Sand Co., Chicago.
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J. W. Paxson Co., Philadelphia, Pa.
Obermayer Company, The S., Cincinnati, O.
Smith Foundry Supply Co., Cincinnati, Ohio.
Springfield Facing Co., Springfield, Mass.
Whitehead Bros. Co., New York.

GRINDING MACHINERY.
Stow Mfg. Co., Binghampton, N. Y.

IRON BUILDINGS.
Berlin Iron Bridge Company, East Berlin, Conn.

IRON FILLER.
J. W. Paxson Co., Philadelphia, Pa.
Vreeland Tompkins, Jersey City, N. J.

MANGANESE AND SILICON.
Cowles Electric Smelting and Aluminum Co., Lockport, N. Y.

MOLDING MACHINES.
Henry E. Pridmore, Chicago, Ill.
J. W. Paxson Co., Philadelphia, Pa.
The Adams Co., Dubuque, Ia.
Tabor Mfg. Co., Elizabeth, N. J.

MOLDING SAND.
Ayers, E. M., Zanesville, Ohio.
Garden City Sand Co.,Chicago, Ill.
J. W. Paxson Co., Philadelphia, Pa.
Whitehead Bros. Co., New York.

PATTERN MAKERS.
The Gobeille Pattern Co., Cleveland, Ohio.

PIG IRON.
Clinton Iron & Steel Co., Pittsburgh, Pa.
Superior Charcoal Iron Co., Detroit, Mich.

PNEUMATIC CHIPPING TOOLS.
Chicago Pneumatic Tool Co., Chicago, Ill.

PLUMBAGO.
Garden City Sand Co., Chicago.
Joseph Dixon Crucible Co., Jersey City, N. J.
J. S. McCormick Company, Pittsburg, Pa.
McCullough-Dalzell Co., Pittsburg, Pa.
Obermayer Company, The S., Cincinnati, O.
Paxson & Co., J. W. Philadelphia, Pa.
Smith Foundry Supply Co., Cincinnati, Ohio
Springfield Facing Co., Springfield, Mass.
Whitehead Bros. Co., New York.

SAND SIFTERS.
Gould & Eberhardt, Newark, N. J.
J. W. Paxson Co., Philadelphia, Pa.
Springfield Foundry Co., Springfield, Oh
Wm. Sellers & Co., Philadelphia, Pa.

SAND BLAST MACHINERY.
Ward & Nash, Chicago, Ill.

STEEL WORKS SUPPLIES AND STOPPERS.
Joseph Dixon Crucible Co., Jersey City, N. J.
McCullough-Dalzell Co., Pittsburg, Pa.
Taylor Crucible Co., Robert J., Philadelphia,

TROLLEY TRACKS.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.

TUMBLING BARRELS.
Estate of Oscar Barnett, Newark, N. J.
Gould & Eberhardt, Newark, N. J.
J. W. Paxson Co., Philadelphia, Pa.
Stover Mfg. Co., Freeport, Ill.
Whiting Foundry Equipment Co., Harvey, Ill.

WHEELBARROWS.
J. W. Paxson Co., Philadelphia, Pa.
Syracuse Chilled Plow Co., Syracuse, N. Y.

WIRE BRUSHES.
Buchel Brush Co., New Orleans, La.
J. W. Paxson Co., Philadelphia, Pa.

Do You Have Small Imperfections in Castings?

TRY TOMPKIN'S

"Smooth On" Castings Iron Compound.

ITS VALUE IS PROVED BY CONTINUED USE AND INCREASING SALES.

VREELAND TOMPKINS, Manufacturing and Analytical Chemist, 551 COMMUNIPAW AVE. JERSEY CITY, N. J.

Superintendents ought to know what they are talking about

Here is what four of them say:

JAMES A. BECKETT, Superintendent W. A. Wood's Mowing & Reaping Machine Co.'s foundry, Hoosick Falls, N. Y., in *The Foundry* for April, says: "The appearance of Mr. West's 'Metallurgy of Cast Iron' at this time is most opportune, and it is safe to predict that it will surpass his earlier works in interest to the foundry trade; and as the value of his work comes to be better understood, it will bear the same relation to the advancement of foundry practice that the works of Sir I. L. Bell, Henry M. Howe and Thomas Turner bear to the improvment in the manufacture of steel."

GEORGE O. VAIR, superintendent Corning Iron Works Foundry, Corning, N. Y., says: "I have read with a great deal of interest and care 'Metallurgy of Cast Iron,' and can conceive of no more valuable work for the founder, the molder and the blast furnaceman, or anyone interested in the production of pig iron or its foundry products, than this valuable book. It should have a choice place on every progressive foundry foreman's desk, as it is an excellent thing to have around."

J. E. THROPP, superintendent Everett Blast Furnace, Everett, Pa., says: "'Metallurgy of Cast Iron' is just what I wanted. It is clearly and forcibly written, and takes up just the questions that furnacemen are now beginning to consider."

C. A. DELANEY, superintendent The Richmond Locomotive and Machine Works, Richmond, Va., says: "Much valuable practical knowledge of the foundry business can be obtained by a study of 'Metallurgy of Cast Iron.' I consider it one of the most valuable works I have ever seen on this subject."

"Metallurgy of Cast Iron"

PRICE, $3.00.

Can be obtained of

THE FOUNDRY PUB. CO., Detroit, Mich.

We are also prepared to furnish all Standard Works pertaining to the trade.

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

15 Beekman Street, NEW YORK

Boston Office, 85 Water Street

F. A. COODRICH & CO.

Incorporated

PIG IRON, STEEL, COKE, ETC.

Detroit, Mich.

MATTHEW ADDY & CO.

CINCINNATI, ST. LOUIS.

Agencies,

Chicago, Detroit, New York,

Philadelphia.

PICKANDS, BROWN & CO.,

Manufacturers, Importers
and Dealers in

PIG IRON AND IRON ORE.

Rookery Building, CHICAGO.

THE DOMHOFF & JOYCE CO.

PIG IRON-COKE.

CINCINNATI.

CLINTON IRON & STEEL CO.

Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

PITTSBURG, PA

15 Cortlandt St., NEW YORK.

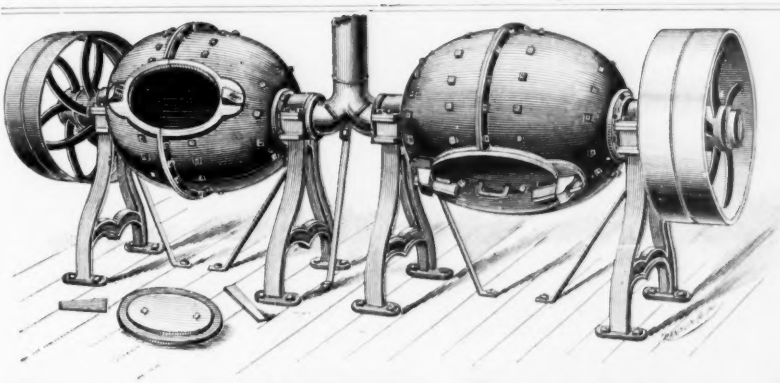
ROGERS, BROWN & CO.

CINCINNATI, CHICAGO,

BUFFALO,

PHILADELPHIA, NEW YORK,

ST. LOUIS



A Fine Pair

Stover's IMPROVED EXHAUST Tumbling Barrels

The Stover Egg Shaped Barrel does doublethe work of any other with less noise and power. It gives the contents a double motion or action—from ends to center and from side to center—causing a thorough mixing and rubbing together of all the parts contained therein, cleaning and polishing the contents better and quicker than any other form of barrel.

Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron wire nails, or any other small articles that require cleaning and polishing.

For full particulars, address,

Stover Manufacturing Co.

205 RIVER STREET, FREEPORT ILL

Straight Talk

To reach the five thousand foundrymen of the United States with a circular would cost you at least a hundred dollars and then inside of a week they would all have found their last resting place through the waste basket.

Contrast the cost of this with a page advertisement in The Foundry. The contents of this journal protect its advertising pages. The Foundry is not destroyed like a newspaper or a circular, its reading matter is worth too much for that. When you place an ad in The Foundry it is a lasting ad, an ad that simply refuses to go into oblivion. Its beneficial effects will only close with eternity.

ESTABLISHED 1854.

Brooklyn Fire Brick Works

CUPOLA BLOCKS, FIRE SAND, FIRE CLAY, FIRE MORTAR, KAOLIN

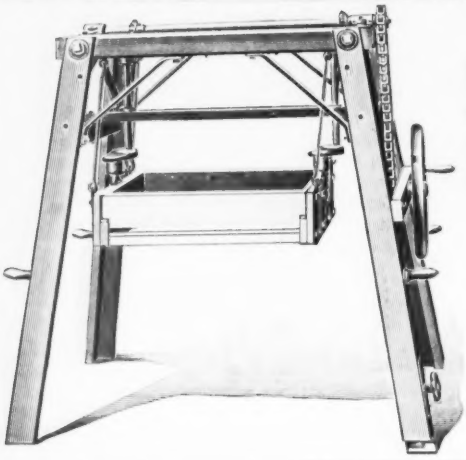
AND ALL FIRE MATERIAL REQUIRED FOR FOUNDRY PURPOSES.

Send for Illustrated Catalogue and Prices.

88 Van Dyke Street, BROOKLYN, N. Y.

We make patterns cheaper, better and in a fraction of the time required to get them out elsewhere. Do you realize that a small pattern shop is a nuisance? It is either a feast or a famine all the time.

The Gobeille Pattern Co., Cleveland, Ohio.



THE PERFECT

Sand Riddling Machine

This is the Best, Simplest, Cheapest, Most Durable and Most Easily Operated Sand Riddling Machine made.

For full particulars and references, address,

THE SPRINGFIELD FOUNDRY CO.

SPRINGFIELD, OHIO.

Estate of Oscar Barnett.

BRUEN, HAMILTON and McWHORTER STREETS
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Equippers of . . .

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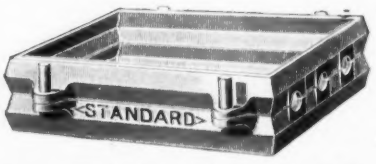


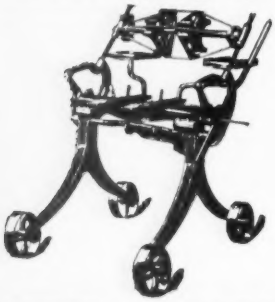
Manufacturers of
OSCAR BARNETT'S
‹STANDARD› FLASK

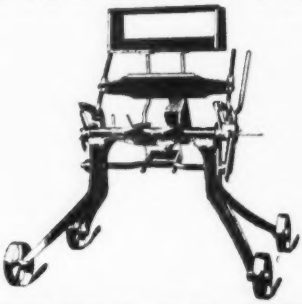
IN BUSINESS OVER 50 YEARS.

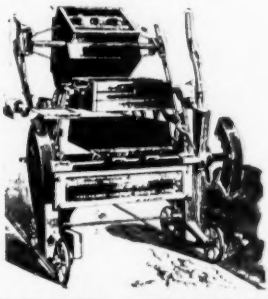
MALLEABLE AND GRAY IRON CASTINGS. HARDWARE SPECIALTIES TO ORDER.

Shoemakers', Saddlers', Tanners' and Curriers' Tools.

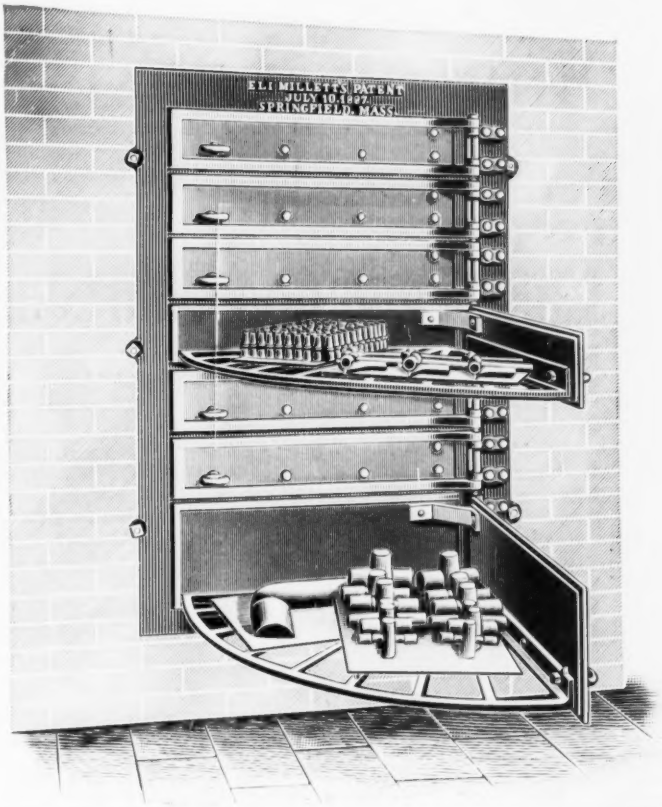
FARWELL'S **MOULDING MACHINES** Send for Catalogue







THE ADAMS COMPANY, DUBUQUE, IOWA



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THE BEST IN THE WORLD

No Foundry using small cores can afford to be without it.

Over one hundred and fifty in use.

Send for our new Catalogue giving names of those using them.

Millett Core Oven Co.

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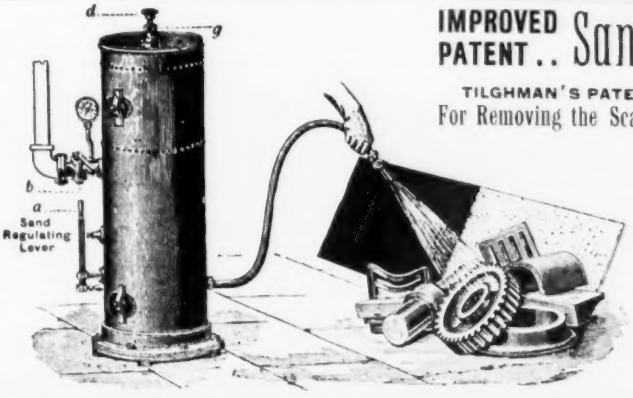
FAST WORK AND DIAMOND SNAP FLASKS

Are inseparably associated. Copy of unsolicited testimonials to this . . effect can be had upon application.

THE DIAMOND CLAMP AND FLASK CO.,
RICHMOND, IND.



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TILGHMAN'S PATENTS MATHEWSON'S PATENTS.

For Removing the Scale from Iron and Steel Plates.

Cleaning Castings, Forgings, etc.

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SOLE AGENTS,

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Exclusive Dealers in the following well known brands of

ANTRIM, ELK RAPIDS,
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All business connected with the sale of the above brands of Charcoal Pig Iron will, from April 1st, 1897, be handled by **The Superior Charcoal Iron Co.**, of Detroit, Mich., which is thus enabled to supply the best iron known for all purposes, and especially for Car Wheels, Malleable Castings, Boiler Tubes, Ship and Armor Plate, Strong High Silicon for Foundry purposes, Basic Iron with the minimum of Silicon and Sulphur, also Iron to take the place of Salisbury, Southern and Swedish Charcoal Iron.

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INSPECTED FOUNDRY IRONS . . . . .

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Sole Factors for DUNBAR STRONG IRON

In New York and New England.

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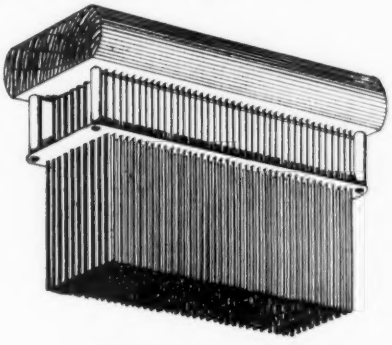
Why deal with Commission people or Agents who give fancy names to Irons and know nothing about their manufacture.

DEAL WITH THE MANUFACTURER DIRECT.

Well, it doesn't look like anything you ever saw before



"IRON CLAD."

Guaranteed Satisfaction or Money Back. You Take no Risk.

SPECIAL FEATURES.—Backs all in one piece; the wires uniformly distributed; each wire separately held and protected from excessive strain by a perforated tin plate; maximum stiffness with maximum elasticity; back with rounded sides; lightness combined with strength; elegance with usefulness; best material with finest workmanship; great durability at a moderate cost.

THE BUCHEL BRUSH CO., New Orleans, La.

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You can get anything wanted AT THE

FOUNDRY SUPPLY DEPOT

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FOUNDRY MOLDING MACHINES,
STRIPPING PLATE MACHINES,
PORTABLE, AIR-POWER, MACHINES,

USING WOOD OR METAL SPLIT PATTERNS, WITHOUT STRIPPING PLATES.

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The Tabor M'f'g Co.,

ELIZABETH, N. J.

ESTABLISHED 1875.

STOW MANUF'G CO.,

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INVENTORS OF THE

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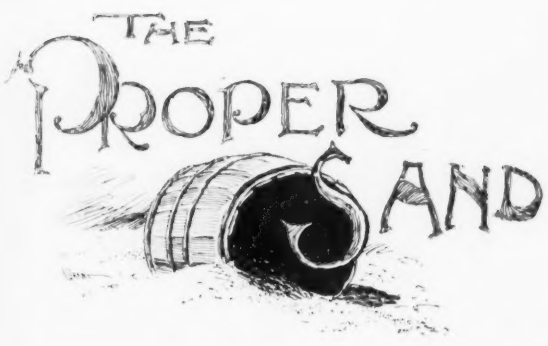
FOR ALL PURPOSES.

The oldest and largest manufacturers in the world

PORTABLE EMERY GRINDER

Take the tool to the work and save heavy handling.

WRITE US FOR CATALOGUE AND PRICES.



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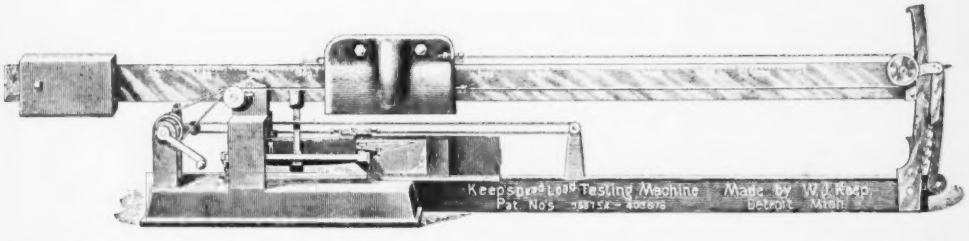
FOR HEAVY MACHINERY CASTINGS?

We guarantee it to Outlast

Any other **Molding Sand** on the Market. **Economy** is the chief element of success in your business at the present time. Give us a trial. Remember, we also furnish **McHenry, St. James, Newport, Centerton, . . . Wanatah and Albany Molding Sand** and all kinds of **Core Sand, Fire Brick, Cupola Blocks, etc.**

The Garden City Sand Co., SUITE No. 1203 SECURITY BUILDING, CHICAGO

"Keep's Test" Apparatus.



HERE IS WHAT ONE LARGE CONCERN SAYS:-IT HAS PAID THEM, WHY NOT YOU?

DETROIT, MICH., March 31st, 1896.

Mr. W. J. Keep, City:

DEAR SIR: We have regulated our foundry mixture by "Keep's Test" during the past year, and can recommend it in highest terms. We know exactly what we are doing and can keep our castings of uniform quality. We find that .160 inches per foot the best shrinkage, and have been able to keep the average strength of a test bar ½ inch square and 12 inches long at 450 pounds.

Very truly yours,
LELAND & FAULCONER MFG. CO.,
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To SAVE MONEY IN YOUR OWN FOUNDRY, ADDRESS **W. J. KEEP, Detroit, Mich.**